

# VLM Multi-Model Comparison Report

**Dataset:** radiation\_treatment\_outcomes\_v1\_1

**Subtask:** radiation\_outcome

## Question:

Based on the provided medical history and cancer evidence, what is the patient's expected response to external beam radiation therapy?

**Correct Answer:** Tumor symptoms controlled

**Model:** OpenGVLab/InternVL3\_5-8B

**middle image from each view:** **[INCORRECT]** <brief reasoning trace with explanation for label selection> | <label> The patient's medical history indicates multiple malignancies, including malignant neoplasms of the lung, lymph nodes, and mediastinum. The timeline includes codes for therapeutic radiology simulation-aided field setting, basic radiation dosimetry calculation, and intensity modulated radiotherapy plan, suggesting that the patient has undergone or is undergoing radiation therapy. However, there is no explicit evidence of the patient's response to the treatment, such as imaging results or clinical assessments indicating tumor symptom control or recurrence. Therefore, based on the provided information, the most appropriate label is "Never achieved complete response" as there is no documented evidence of a complete response to the radiation therapy. | <label> "Never achieved complete response"

**middle axial image:** **[INCORRECT]** <brief reasoning trace with explanation for label selection> | <label> The patient's medical history indicates multiple malignancies, including malignant neoplasms of the lung, lymph nodes, and mediastinum. The timeline includes codes for therapeutic radiology simulation-aided field setting, basic radiation dosimetry calculation, and intensity modulated radiotherapy plan, suggesting that the patient has undergone or is undergoing radiation therapy. However, there is no explicit evidence of the patient's response to the treatment, such as imaging results or clinical assessments indicating tumor symptom control or recurrence. Therefore, based on the provided information, the most appropriate label is "Never achieved complete response" as there is no documented evidence of a complete response to the radiation therapy. | <label> "Never achieved complete response"

**no image:** **[INCORRECT]** <brief reasoning trace with explanation for label selection> | <label> The patient's medical history indicates multiple malignancies, including malignant neoplasms of the lung, lymph nodes, and mediastinum. The timeline includes codes for therapeutic radiology simulation-aided field setting, basic radiation dosimetry calculation, and intensity modulated radiotherapy plan, suggesting that the patient has undergone or is undergoing radiation therapy. However, there is no explicit evidence of the patient's response to the treatment, such as imaging results or clinical assessments indicating tumor symptom control or recurrence. Therefore, based on the provided information, the most appropriate label is "Never achieved complete response" as there is no documented evidence of a complete response to the

radiation therapy. | <label> "Never achieved complete response"

**no radiology report: [INCORRECT]** <brief reasoning trace with explanation for label selection> | <label> The patient's medical history indicates multiple malignancies, including malignant neoplasms of the lung, lymph nodes, and mediastinum. The timeline includes codes for therapeutic radiology simulation-aided field setting, basic radiation dosimetry calculation, and intensity modulated radiotherapy plan, suggesting that the patient has undergone or is undergoing radiation therapy. However, there is no explicit evidence of the patient's response to the treatment, such as imaging results or clinical assessments indicating tumor symptom control or recurrence. Therefore, based on the provided information, the most appropriate label is "Never achieved complete response" as there is no documented evidence of a complete response to the radiation therapy. | <label> "Never achieved complete response"

**100 axial images (no timeline): [INCORRECT]** <No medical history or cancer evidence provided in the timeline to base the expected response to external beam radiation therapy.> | <Never achieved complete response>

### Model: OctoMed/OctoMed-7B

**middle image from each view: [INCORRECT]** <think>First, I need to analyze the patient's timeline to determine their expected response to external beam radiation therapy. The options are "Tumor symptoms controlled," "Tumor symptoms returned," or "Never achieved complete response." Looking at the patient's medical history, they have multiple ICD-10 codes indicating various malignancies: C34.90 (lung cancer), C77.0 (lymph node metastasis), C38.1 (anterior mediastinal tumor), and C38.2 (posterior mediastinal tumor). This suggests advanced or metastatic disease involving multiple sites. The STANFORD\_OBS/Flowsheet entries provide clinical assessments. Notably, there are entries related to sensory perception, altered elimination patterns, altered mental status, fall risks, and delirium interventions. The patient has a total score of 21 on the Confusion Assessment Method (CAM), indicating significant delirium. Delirium can be a sign of systemic illness, including cancer progression or treatment side effects. The CPT codes indicate that radiation therapy was planned and delivered, including IMRT planning and multiple treatments. However, the presence of delirium and altered mental status might affect the patient's ability to tolerate or respond to treatment fully. Importantly, there is no mention of tumor response assessment such as imaging results showing tumor shrinkage or complete response. The records focus on symptom management, delirium interventions, and fall risks rather than tumor control outcomes. Given the advanced, multi-site malignancies and the presence of significant comorbidities (delirium, altered mental status), it is likely that the patient did not achieve a complete response to radiation therapy. The absence of documented tumor control or resolution, combined with the clinical context, points towards the option "Never achieved complete response."</think> <brief reasoning trace with explanation for label selection> | <label> The patient has advanced, multi-site malignancies (lung, lymph nodes, mediastinum) with no documented tumor response metrics (e.g., imaging, pathology). Clinical notes emphasize delirium, altered mental status, and fall risks, indicating systemic compromise. Radiation therapy was planned but no evidence of tumor control or resolution is provided. The absence of complete response documentation and presence of significant comorbidities suggest the patient "Never achieved complete response."</label>

**middle axial image: [INCORRECT]** <think>First, I need to analyze the patient's timeline to determine their expected response to external beam radiation therapy (EBRT). The options are "Tumor symptoms controlled," "Tumor symptoms returned," or "Never achieved complete response." Looking at the timeline, the patient has multiple ICD-10 codes indicating various malignancies: C34.90 (lung), C77.0 (lymph nodes of head/neck), C38.1 (anterior mediastinum), and C38.2 (posterior mediastinum). This suggests multiple primary or metastatic sites, which complicates treatment. The STANFORD\_OBS/Flowsheet entries provide clinical assessments. Key points include: - Sensory Perception: 4 (normal) - Altered Elimination Patterns: 0 (no

issues) - Altered Mental Status: 0 (no issues) - Other Fall Risks: 2 (some risk) - CAM Results: Negative - RASS: Not specified, but other entries like Total Score (21 and 22) might relate to mental status or other assessments. - Fall Interventions: Standard - Delirium Interventions: Manage pain, promote sleep, manage toileting - Mobility: 4 (normal) - Moisture: 4 (normal) - High Risk for Delirium?: No The CPT codes indicate that radiation therapy was planned and delivered (77280, 77300, 77301, 77338, 77427, 77386). This confirms that EBRT was administered. However, the patient's symptoms and functional status are mostly normal (Sensory, Elimination, Mental Status, Mobility, Moisture). There's no mention of tumor shrinkage, symptom relief, or complete response. The presence of multiple malignancies and the lack of documented tumor response in the timeline suggest that the treatment may not have achieved a complete response. The options are: - "Tumor symptoms controlled": This would require evidence of symptom improvement or stabilization. - "Tumor symptoms returned": This would require prior control followed by recurrence. - "Never achieved complete response": This implies that the treatment did not fully eliminate the tumor. Given the timeline, there's no indication that symptoms were controlled or that they returned after being controlled. The patient's functional status is stable, but without specific imaging or pathology data showing tumor response, it's hard to confirm symptom control. The presence of multiple malignancies and the lack of any documented tumor response in the timeline (no imaging results, no pathology reports, no notes on tumor size reduction) suggest that the patient likely "Never achieved complete response." Therefore, the most appropriate label is "Never achieved complete response."</think> <brief reasoning trace with explanation for label selection> | <label> The patient's timeline shows multiple malignancies (lung, lymph nodes, mediastinum) but no documented evidence of tumor response (e.g., imaging, pathology, or symptom improvement). The STANFORD\_OBS/Flowsheet focuses on functional status (e.g., mobility, delirium interventions) without addressing tumor control. The absence of tumor-specific outcomes or symptom resolution indicates the treatment did not achieve a complete response. <answer>Never achieved complete response</answer></think>

**no image: [INCORRECT]** <think>First, I need to analyze the patient's timeline to determine their expected response to external beam radiation therapy (EBRT). The options are "Tumor symptoms controlled," "Tumor symptoms returned," or "Never achieved complete response." Looking at the timeline, the patient has multiple ICD-10 codes indicating various malignancies: C34.90 (lung), C77.0 (lymph nodes of head/neck), C38.1 (anterior mediastinum), and C38.2 (posterior mediastinum). This suggests multiple primary or metastatic sites, which complicates treatment. The STANFORD\_OBS/Flowsheet entries show several assessments. The patient has a "Total Score" of 21 and 21, which might relate to some scoring system, but without more context, it's hard to interpret. There are entries about sensory perception, altered elimination patterns, altered mental status, fall risks, and mobility. However, these seem more related to general patient status rather than direct tumor response. The CPT codes listed are related to radiation therapy planning and delivery, including IMRT and dosimetry. This indicates that radiation therapy was planned and administered. However, the timeline does not mention any follow-up imaging or pathology results post-radiation to assess tumor response. There are no documented outcomes like tumor shrinkage, recurrence, or complete response. The medications listed include albuterol and ipratropium, which are for respiratory issues, possibly related to lung involvement, but again, no direct evidence of tumor response is provided. Given the lack of specific data on tumor response (e.g., imaging showing control, recurrence, or complete response), and the presence of multiple malignancies, it's reasonable to conclude that the patient's tumor symptoms were not fully controlled or resolved. The presence of ongoing symptoms (as indicated by altered mental status, fall risks, etc.) and the complexity of the disease suggest that complete response was not achieved. Therefore, the most appropriate label is "Never achieved complete response."</think> <brief reasoning trace with explanation for label selection> | <label> The patient's timeline includes multiple malignancies (lung, lymph nodes, mediastinum) and radiation therapy planning (CPT4 codes). However, there is no

documented evidence of tumor response (e.g., imaging, pathology, or clinician assessments confirming control, recurrence, or complete response). The presence of ongoing symptoms (e.g., altered mental status, fall risks) and complex disease suggests incomplete treatment response. Therefore, the most accurate label is "Never achieved complete response."</think>  
<answer>Never achieved complete response</answer>

**no radiology report: [INCORRECT]** <think>First, I need to analyze the patient's timeline to determine their expected response to external beam radiation therapy (EBRT). The options are "Tumor symptoms controlled," "Tumor symptoms returned," or "Never achieved complete response." Looking at the timeline, the patient has multiple ICD-10 codes indicating various malignancies: C34.90 (lung), C77.0 (lymph nodes of head/neck), C38.1 (anterior mediastinum), and C38.2 (posterior mediastinum). This suggests multiple primary or metastatic sites, which complicates treatment. The STANFORD\_OBS/Flowsheet entries provide clinical assessments. Key points include: - Sensory Perception: 4 (normal) - Altered Elimination Patterns: 0 (no issues) - Altered Mental Status: 0 (no issues) - Other Fall Risks: 2 (some risk) - CAM Results: Negative - RASS: Not specified, but other entries like Total Score (21 and 22) might relate to mental status or other assessments. - Fall Interventions: Standard - Delirium Interventions: Manage pain, promote sleep, manage toileting - Mobility: 4 (normal) - Moisture: 4 (normal) - High Risk for Delirium?: No The CPT codes indicate that radiation therapy was planned and delivered (77280, 77300, 77301, 77338, 77427, 77386). This confirms that EBRT was administered. However, the patient's clinical status shows no significant improvement in symptoms. The sensory, elimination, and mental status are normal, but there are other risks (like fall risks). The delirium interventions suggest some concern, but CAM is negative. The presence of multiple malignancies and the lack of documented symptom improvement or resolution in the timeline suggest that the tumor symptoms were not fully controlled. The options are about tumor symptoms. Since the patient has multiple sites and the timeline doesn't show resolution, "Tumor symptoms controlled" is unlikely. "Tumor symptoms returned" would imply prior control followed by recurrence, but there's no indication of prior improvement. "Never achieved complete response" aligns with persistent symptoms despite treatment. Therefore, the correct label is "Never achieved complete response."</think> <brief reasoning trace with explanation for label selection> | <label> The patient's timeline shows multiple malignancies (lung, lymph nodes, mediastinum) and radiation therapy was planned and delivered (CPT codes). However, there is no documented evidence of tumor symptom control, resolution, or improvement. The STANFORD\_OBS/Flowsheet does not indicate symptom relief, and the presence of multiple tumors suggests persistent disease. Thus, the patient likely "Never achieved complete response."</label>

**100 axial images (no timeline): [INCORRECT]** <think>First, I note that the question asks about the patient's expected response to external beam radiation therapy based on the provided medical history and cancer evidence. The options are "Tumor symptoms controlled," "Tumor symptoms returned," or "Never achieved complete response." Looking at the PATIENT\_TIMELINE provided, the only entries are: - [1947-01-26 00:00] | MEDS\_BIRTH - [1947-01-26 00:00] | Ethnicity/38003564 - [1947-01-26 00:00] | Race/8527 These entries do not provide any specific medical history, cancer diagnosis, treatment details, or outcomes. There is no information about the patient's cancer stage, tumor biology, treatment intent, margins, nodal status, biomarkers, or any documented outcomes such as imaging results or clinician assessments. Since the question requires basing the decision solely on the PATIENT\_TIMELINE, and the timeline only contains demographic data (birth date, ethnicity, race) without any clinical or treatment-related information, it is impossible to determine the patient's response to radiation therapy from this data alone. Therefore, the correct label must be "Never achieved complete response," as there is no evidence to suggest any tumor control or response, nor any indication that symptoms returned. The lack of any treatment or outcome data means the patient could not have achieved a complete response or any other response to therapy.</think> <Explanation>There is no information in the PATIENT\_TIMELINE regarding

cancer diagnosis, treatment, or outcomes. Without data on tumor response, symptoms, or treatment results, it is impossible to determine the patient's expected response to external beam radiation therapy. The absence of any clinical or treatment-related evidence necessitates selecting "Never achieved complete response" as the most accurate label.</think>  
<Explanation>There is no information in the PATIENT\_TIMELINE regarding cancer diagnosis, treatment, or outcomes. Without data on tumor response, symptoms, or treatment results, it is impossible to determine the patient's expected response to external beam radiation therapy. The absence of any clinical or treatment-related evidence necessitates selecting "Never achieved complete response" as the most accurate label.</think> <label>Never achieved complete response</label>

### **Model: Qwen/Qwen3-VL-8B-Instruct**

**middle image from each view:** **[INCORRECT]** No evidence of tumor response or symptom control documented post-radiation; no imaging, pathology, or clinical outcome data provided to assess efficacy. | Never achieved complete response

**middle axial image:** **[INCORRECT]** No evidence of tumor response or symptom control documented post-radiation; no imaging, pathology, or clinical outcome data provided to assess efficacy. | Never achieved complete response

**no image:** **[INCORRECT]** No evidence of tumor response or symptom control documented post-radiation; no imaging or pathology outcomes reported; only radiation treatment codes and supportive care noted. | Never achieved complete response

**no radiology report:** **[INCORRECT]** No evidence of tumor response or symptom control documented post-radiation; no imaging, pathology, or clinical outcome data provided to assess efficacy. | Never achieved complete response

**100 axial images (no timeline):** **[INCORRECT]** No evidence of cancer diagnosis, treatment, or response to radiation therapy is present in the provided PATIENT\_TIMELINE. The timeline only contains birth and demographic data. | Never achieved complete response

### **Model: google/medgemma-1.5-4b-it**

**middle image from each view:** **[CORRECT]** <brief reasoning trace with explanation for label selection> | <label> The patient has a history of lung cancer (Malignant neoplasm of unspecified part of unspecified bronchus or lung) diagnosed in 2015. The patient received external beam radiation therapy (EBRT) as indicated by the CPT codes 77300, 77301, 77338, 77427, and 77386. The patient also received bronchodilator medications (albuterol and ipratropium bromide) which are commonly used in patients with lung cancer, especially those undergoing radiation therapy, to manage bronchospasm and airway inflammation. The presence of these medications suggests the patient was likely experiencing respiratory symptoms related to the cancer or the treatment. Although the specific outcome of the radiation therapy is not explicitly stated in the timeline, the use of bronchodilators often indicates ongoing respiratory symptoms or risk. Therefore, the most likely expected response is that tumor symptoms (potentially including respiratory symptoms) have not been completely controlled. Tumor symptoms returned | Never achieved complete response | Tumor symptoms controlled

**middle axial image:** **[INCORRECT]** <brief reasoning trace with explanation for label selection> | <label> The patient has a history of malignant neoplasm of the lung (C34.90), secondary malignant neoplasm of lymph nodes (C77.0), and malignant neoplasm of the anterior mediastinum (C38.1) and posterior mediastinum (C38.2). These are all lung cancer diagnoses. The patient received external beam radiation therapy (EBRT) as indicated by the CPT codes 77300, 77301, 77338, 77427, and 77386. The patient also received bronchodilator medications (albuterol and ipratropium bromide) and saline inhalation, suggesting potential respiratory

issues or airway management during treatment. The patient's clinical status during treatment is documented with Stanford observations, including falls, activity levels, and potential delirium risk factors. However, the provided timeline does not contain any explicit documentation of tumor response (e.g., imaging reports, pathology results, or clinical assessments specifically stating tumor shrinkage or resolution of symptoms). Therefore, based solely on the provided information, we cannot determine the patient's response to the radiation therapy. The absence of documented tumor response means we cannot conclude that the tumor symptoms are controlled or returned. <label>Never achieved complete response</label>

**no image:** [INCORRECT] <brief reasoning trace with explanation for label selection> | <label> The patient has a history of lung cancer (Malignant neoplasm of unspecified part of unspecified bronchus or lung) diagnosed in 2015. The patient received external beam radiation therapy (EBRT) as indicated by the CPT codes 77300, 77301, 77338, 77427, and 77386. The patient also received bronchodilator medications (albuterol and ipratropium bromide) which are commonly used in patients with lung cancer, especially those undergoing radiation therapy, to manage bronchospasm. The patient also received sodium chloride inhalation solution. The patient's clinical status, as documented by the Stanford observations, shows a total score of 21, indicating a high risk for delirium. The patient also has a history of falls, including a fall within the last admission. The patient's overall clinical picture suggests significant respiratory compromise and high risk for delirium, which are common side effects of radiation therapy for lung cancer. The patient's symptoms are likely related to the cancer and its treatment. Tumor symptoms controlled | Tumor symptoms returned | Never achieved complete response

**no radiology report:** [INCORRECT] <brief reasoning trace with explanation for label selection> | <label> The patient has a history of malignant neoplasm of the lung (C34.90), secondary malignant neoplasm of lymph nodes (C77.0), and malignant neoplasm of the anterior mediastinum (C38.1) and posterior mediastinum (C38.2). These findings indicate a diagnosis of lung cancer with mediastinal involvement. The patient received external beam radiation therapy (EBRT) as indicated by the CPT codes 77300, 77301, 77338, 77427, and 77386. The patient also received bronchodilator medications (albuterol and ipratropium bromide) and saline inhalation, suggesting potential respiratory symptoms or management related to the cancer or its treatment. However, the provided timeline does not contain any explicit documentation of tumor symptoms (e.g., pain, cough, shortness of breath) being controlled, returned, or absent after the radiation therapy. Therefore, based solely on the provided information, we cannot definitively determine the patient's response to EBRT. The available data focuses on the diagnosis, staging, and treatment details, not the clinical outcome regarding tumor symptoms. <label>Never achieved complete response</label>

**100 axial images (no timeline):** [INCORRECT] <reasoning trace with explanation for label selection> | Tumor symptoms controlled <label> <reasoning trace with explanation for label selection> | Tumor symptoms returned <label> <reasoning trace with explanation for label selection> | Never achieved complete response

### **Model: google/medgemma-4b-it**

**middle image from each view:** [CORRECT] Tumor symptoms controlled

**middle axial image:** [CORRECT] Tumor symptoms controlled

**no image:** [CORRECT] Tumor symptoms controlled

**no radiology report:** [CORRECT] Tumor symptoms controlled

**100 axial images (no timeline):** [INCORRECT] The provided timeline does not contain any information about the patient's cancer history, treatment, or response to radiation therapy. Therefore, I cannot determine the patient's expected response to external beam radiation therapy based on the given information. <reasoning trace: The timeline only contains birth information and demographic data, which is insufficient to assess the patient's cancer history or

response to radiation therapy.> | Never achieved complete response



## Dataset: tb\_v1\_1\_tb\_classification\_tasks

### Subtask: pneumonitis\_infection\_answer

#### Question:

Based on the provided medical history, cancer evidence, and imaging findings, which diagnosis is most consistent with the imaging differential?

**Correct Answer:** -1

#### Model: OpenGVLab/InternVL3\_5-8B

**middle image from each view:** [INCORRECT] <brief reasoning trace with explanation for label selection> | <label> The timeline shows multiple emergency room visits and radiology imaging over several years, indicating a chronic condition. The repeated imaging of the chest and whole body suggests ongoing monitoring for abnormalities. The absence of specific evidence for infection or pneumonitis, such as fever or positive cultures, and the normal cytology report, point towards a chronic condition like cancer progression. The repeated imaging and emergency visits are consistent with monitoring for cancer recurrence or progression. | <Cancer Progression>

**middle axial image:** [INCORRECT] <brief reasoning trace with explanation for label selection> | <label> The timeline shows multiple visits to the emergency room and radiology, with imaging studies conducted over several years. The repeated imaging and visits suggest ongoing monitoring for potential issues. The absence of specific findings such as infection or pneumonitis in the provided timeline, and the lack of evidence for new cancer progression, makes it difficult to definitively diagnose either condition. Therefore, the most consistent diagnosis based on the provided information is "Neither". | <label> Neither

**no image:** [INCORRECT] <The patient has a history of multiple emergency room visits and chest imaging studies over several years. The repeated imaging and visits suggest a chronic condition. The absence of any specific evidence of infection or pneumonitis, such as positive cultures or specific inflammatory markers, and the lack of new cancer diagnosis or progression indicators, points towards a chronic condition that is not clearly defined as either infection or cancer progression. The normal cytology report and negative HPV test further support the absence of an active infection or cancer-related changes.> | <Neither>

**no radiology report:** [INCORRECT] <brief reasoning trace with explanation for label selection> | <label> The timeline shows multiple radiology visits and imaging studies, particularly focusing on the chest area. The repeated imaging and emergency room visits suggest ongoing monitoring and possible complications. The presence of multiple imaging studies over several years indicates a need for continuous evaluation, which is often seen in cases of cancer progression. The absence of specific evidence pointing to infection or pneumonitis, such as clinical symptoms or specific test results, makes "Cancer Progression" the most consistent diagnosis based on the provided timeline. | Cancer Progression

**100 axial images (no timeline):** [INCORRECT] <brief reasoning trace with explanation for label selection> | <label> The provided patient timeline does not include any specific medical history, cancer evidence, or imaging findings that would help determine a diagnosis. Without relevant clinical data, it is not possible to make a definitive diagnosis. | Neither



### Model: OctoMed/OctoMed-7B

**middle image from each view: [INCORRECT]** <think>First, I carefully examine the provided patient timeline and imaging data to identify relevant clinical and radiological findings. The timeline shows multiple dates of imaging studies, including CT scans of the chest and whole body, as well as ER visits and radiology consultations. The imaging studies are labeled with codes such as SR, CR, OT, PT, and CT, indicating different types of scans and possibly different phases or modalities. Next, I note that the patient has a history of emergency room visits and multiple imaging studies over several years, suggesting ongoing monitoring or treatment. The imaging findings include axial and sagittal CT images of the chest, which show lung parenchyma and mediastinal structures. The images reveal areas of abnormality, such as possible consolidation, cavitation, or nodules, which could be consistent with infection, inflammation, or malignancy. The patient also has a cytology report (LOINC 47528-5) from December 2016 that is normal, and a negative HPV 16 DNA test (LOINC 59263-4) from the same date, which may relate to cervical cancer screening but does not directly inform the chest findings. In May 2017, the patient underwent multiple CT scans of the chest and whole body, which likely aim to assess for cancer progression or metastasis. The presence of multiple CT scans over time suggests concern for cancer monitoring. The question asks which diagnosis is most consistent with the imaging differential. The options are pneumonitis, infection, both, cancer progression, or neither. Given the imaging findings of lung abnormalities and the clinical context of multiple imaging studies over years, the differential includes infection (pneumonitis) and cancer progression. The presence of cavitation or nodules could be seen in both infectious and malignant processes. However, the repeated imaging and ER visits may indicate ongoing evaluation for cancer progression, especially if the patient has a known malignancy. Without explicit evidence of infection (e.g., fever, positive cultures) or pneumonitis (e.g., ground-glass opacities, clinical symptoms), and given the focus on cancer monitoring, the most consistent diagnosis is cancer progression. Therefore, the answer is Cancer Progression.</think> <brief reasoning trace with explanation for label selection> | <label> The imaging findings show abnormalities consistent with both infection and cancer progression. However, the repeated imaging studies and clinical context suggest a focus on cancer monitoring. Without explicit evidence of infection (e.g., fever, positive cultures) or pneumonitis (e.g., ground-glass opacities), the most consistent diagnosis is cancer progression. <answer>Cancer Progression</answer></think>

**middle axial image: [INCORRECT]** <think>First, I carefully examine the provided patient timeline for any relevant medical history, treatments, or diagnostic findings that could inform the imaging differential diagnosis. The timeline includes multiple dates of imaging studies, primarily chest CT scans and other radiology reports, but no explicit mention of cancer diagnosis, treatment, or pathology results. Looking at the imaging dates, there are several CT chest scans from 2011, 2016, and 2017, with multiple entries for each date, indicating repeated imaging. However, the timeline does not specify any cancer diagnosis, tumor type, or treatment details such as chemotherapy, radiation, or surgery. There is no mention of cytology or HPV testing related to cervical cancer, which is normal and negative, suggesting no active cervical malignancy. The patient has a history of montelukast use (RxNorm/200224) starting in May 2017, which is a leukotriene receptor antagonist used for asthma or allergies, not directly related to cancer. The repeated ER visits and imaging could be for various reasons, but no clear evidence of cancer progression or recurrence is documented. Importantly, the imaging findings themselves are not described in detail here. Without specific radiologic descriptions (e.g., masses, nodules, lymphadenopathy, or pleural effusions), I cannot definitively correlate the imaging with cancer progression or other diagnoses. The options include pneumonitis, infection, both, cancer progression, or neither. Given the lack of explicit cancer diagnosis or progression in the timeline, and no clear evidence of infection or pneumonitis (such as fever, infiltrates, or clinical notes), the most appropriate choice is "Neither," as there is no documented evidence supporting any of the other options.</think> <brief reasoning trace with explanation for label

selection> | <label> The patient timeline does not provide any explicit evidence of cancer diagnosis, progression, or treatment. There are no documented cytology or HPV results indicating cervical cancer, and no imaging findings or clinical notes suggesting pneumonitis or infection. The repeated imaging studies (CT chest) lack detailed descriptions to support cancer progression or infection. Therefore, the most consistent label is "Neither."</think>  
<answer>Neither</answer>

**no image: [INCORRECT]** <think>First, I need to analyze the patient's timeline to understand their medical history, treatments, and imaging findings. The timeline shows multiple dates with imaging studies, emergency room visits, and some lab tests. Looking at the imaging entries, there are several chest CT scans and other imaging studies over the years. The key is to identify any changes or abnormalities that might indicate pneumonitis, infection, cancer progression, or neither. The patient had a cervical cytology and HPV test in 2016, both normal, which might be relevant for ruling out cervical cancer but not directly related to chest issues. The medications include montelukast, which is for asthma or allergies, suggesting possible respiratory issues. The imaging from 2011 and 2016 shows some chest scans, but without specific findings described, I need to look for changes over time. The 2017 series includes multiple CT scans of the chest and whole body, which might show progression or new lesions. Since the question is about the imaging differential, I should focus on the chest imaging. The options are pneumonitis, infection, both, cancer progression, or neither. If there are signs of inflammation or infection on imaging, such as infiltrates or consolidation, that could suggest pneumonitis or infection. If there are new or enlarging masses, nodules, or lymphadenopathy, that might indicate cancer progression. The timeline doesn't provide explicit findings like "ground glass opacities" or "consolidation" for pneumonitis, nor does it mention fever or leukocytosis for infection. Similarly, no clear evidence of tumor growth or metastasis is noted. Given the lack of specific imaging findings described in the timeline, and no documented clinical signs pointing to infection or pneumonitis, the most consistent diagnosis based solely on the provided data would be "Neither," as there is no explicit evidence supporting the other options.</think> <brief reasoning trace with explanation for label selection> | <label> The provided PATIENT\_TIMELINE includes multiple imaging studies (CT scans, X-rays) but does not specify findings such as infiltrates, consolidation, or tumor progression. Without documented evidence of pneumonitis (e.g., ground-glass opacities), infection (e.g., fever, leukocytosis), or cancer progression (e.g., new lesions, nodal enlargement), the imaging differential cannot be conclusively attributed to any of the listed diagnoses. The absence of explicit pathological or clinical evidence necessitates selecting "Neither." <answer>Neither</answer></think>

**no radiology report: [INCORRECT]** <think>First, I carefully examine the provided CT images to identify any abnormalities or features that might suggest a diagnosis. The images show axial slices progressing from the lower abdomen to the thorax. I note the presence of gas-filled structures in the abdomen, which could be bowel loops, and the lungs appear aerated with no obvious masses or consolidations. The bones, including the spine and pelvis, appear intact without lytic or blastic lesions. There is no visible pleural effusion or pneumothorax. The soft tissues do not show any obvious masses or swelling. Next, I consider the patient's timeline. The patient has a history of medical interventions, including medications (montelukast), and multiple imaging studies over several years. The most recent imaging includes CT scans of the chest and whole body, which do not show any new or progressive lesions. The cytology report and HPV testing are normal, suggesting no active cervical pathology. There is no evidence of cancer progression or new metastatic disease. Given the absence of new findings on imaging, no signs of infection or pneumonitis, and no evidence of cancer progression, the most consistent diagnosis is "Neither." The imaging does not support pneumonitis, infection, or cancer progression at this time.</think> <answer>Neither</answer>

**100 axial images (no timeline): [INCORRECT]** <think>First, I note that the question asks for the most consistent diagnosis based on the patient's timeline, cancer evidence, and imaging findings. However, the provided image is a CT scan of the pelvis, not the chest or head/neck

region. The image shows axial slices progressing from the pelvis upward, with the final slice showing the lower neck region. The timeline data provided is minimal and only includes birthdate and ethnicity/race, with no clinical or cancer-related details. Given the lack of clinical or cancer-related information in the timeline, and the absence of any specific imaging findings related to cancer progression, pneumonitis, or infection, it is impossible to definitively diagnose based solely on the provided data. The imaging does not show clear signs of pneumonitis (lung inflammation), infection, or cancer progression. The timeline does not mention any cancer history, treatments, or outcomes. Therefore, the most appropriate answer is "Neither," as there is no evidence to support any of the other options.</think> <answer>Neither</answer>

### **Model: Qwen/Qwen3-VL-8B-Instruct**

**middle image from each view:** **[INCORRECT]** The imaging findings (CT scans from 2011, 2016, and 2017) show recurrent, progressive, and multi-site lesions consistent with metastatic cancer. The timeline includes multiple emergency room visits with radiology findings, and a whole-body CT in 2017 confirms widespread disease. There is no evidence of infection or pneumonitis in the timeline or imaging. The documented history and imaging are consistent with cancer progression. | Cancer Progression

**middle axial image:** **[INCORRECT]** The imaging findings (CT scans from 2011, 2016, 2017) show recurrent or progressive lesions, particularly in the chest and abdomen, with no evidence of infection or pneumonitis (no inflammatory or infectious markers documented). The patient's history includes multiple ER visits and imaging studies, suggesting ongoing disease monitoring. The presence of multiple lesions and the context of repeated imaging over time are most consistent with cancer progression rather than infection or pneumonitis. There is no evidence of resolution or improvement that would suggest infection. Therefore, "Cancer Progression" is the most consistent diagnosis. | Cancer Progression

**no image:** **[INCORRECT]** The patient has a documented history of multiple emergency room visits with chest imaging (CXR, CT) in 2011, 2016, and 2017, all occurring without clear evidence of infection or pneumonitis (no fever, no microbiological confirmation, no inflammatory markers noted). The 2017 whole-body CT scan is the most comprehensive imaging, and while it does not explicitly state a diagnosis, the pattern of repeated chest imaging and ER visits over time, without resolution of symptoms or infection markers, suggests a chronic, progressive process. The absence of cervical/vaginal cytology abnormalities (normal cytology, HPV negative) rules out gynecologic malignancy. The repeated imaging and lack of resolution point toward cancer progression as the most consistent explanation for the imaging findings, especially given the chronicity and pattern of presentation. No evidence supports infection or pneumonitis as the primary diagnosis. | Cancer Progression

**no radiology report:** **[INCORRECT]** The patient's timeline documents a diagnosis of malignant neoplasm of the right lung (C34.31) and a secondary malignant neoplasm of the brain (C79.31) in 2017. Treatment included 3D radiotherapy planning and stereotactic radiosurgery for the brain lesion. However, the timeline does not contain any subsequent imaging, clinical assessments, or documentation of tumor response (e.g., symptom control, progression, or recurrence) following radiation therapy. Without evidence of clinical outcome or follow-up, it is impossible to determine if the treatment was effective or if symptoms returned. Therefore, the most accurate option based on the provided evidence is "Never achieved complete response", as there is no documentation of a successful outcome. <brief reasoning trace with explanation for label selection> | "Never achieved complete response"

**100 axial images (no timeline):** **[INCORRECT]** The provided PATIENT\_TIMELINE contains no medical history, cancer evidence, imaging findings, or any clinical data. It only includes birth date, ethnicity, and race identifiers. Without any evidence of cancer, infection, or pneumonitis, no diagnosis can be supported. <brief reasoning trace with explanation for label selection> |

Neither

**Model:** google/medgemma-1.5-4b-it

**middle image from each view:** [INCORRECT] <brief reasoning trace with explanation for label selection> | <label> The patient has a history of multiple chest imaging studies (CT, Chest X-ray, PET) performed between 2011 and 2017. These imaging studies show multiple nodules in the lungs. The patient also has a history of smoking, which is a risk factor for lung cancer. The presence of multiple lung nodules on imaging, especially in a patient with a smoking history, raises concern for malignancy. While infection can cause lung nodules, the chronicity of the imaging findings (multiple studies over several years) and the patient's smoking history make cancer progression a more likely diagnosis. The absence of specific findings suggestive of infection (e.g., consolidation, pleural effusion) further supports this. Cancer Progression | Both | Infection | Pneumonitis | Neither

**middle axial image:** [INCORRECT] <brief reasoning trace with explanation for label selection>  
|<label> The patient has a history of chest imaging (CT chest) performed on 2017-05-25 and  
2017-06-13. The CT scans show a mass in the left lung. The patient also has a history of ER  
visits in 2011 and 2016, suggesting potential symptoms or concerns. The presence of a lung  
mass on CT imaging is highly suggestive of cancer. Cancer Progression | Both <brief reasoning  
trace with explanation for label selection> |<label> The patient has a history of chest imaging  
(CT chest) performed on 2017-05-25 and 2017-06-13. The CT scans show a mass in the left  
lung. The patient also has a history of ER visits in 2011 and 2016, suggesting potential  
symptoms or concerns. The presence of a lung mass on CT imaging is highly suggestive of  
cancer. Cancer Progression | Both <brief reasoning trace with explanation for label selection> |  
<label> The patient has a history of chest imaging (CT chest) performed on 2017-05-25 and  
2017-06-13. The CT scans show a mass in the left lung. The patient also has a history of ER  
visits in 2011 and 2016, suggesting potential symptoms or concerns. The presence of a lung  
mass on CT imaging is highly suggestive of cancer. Cancer Progression | Both <brief reasoning  
trace with explanation for label selection> |<label> The patient has a history of chest imaging  
(CT chest) performed on 2017-05-25 and 2017-06-13. The CT scans show a mass in the left  
lung. The patient also has a history of ER visits in 2011 and 2016, suggesting potential  
symptoms or concerns. The presence of a lung mass on CT imaging is highly suggestive of  
cancer. Cancer Progression | Both <brief reasoning trace with explanation for label selection> |  
<label> The patient has a history of chest imaging (CT chest) performed on 2017-05-25 and  
2017-06-13. The CT scans show a mass in the left lung. The patient also has a history of ER  
visits in 2011 and 2016, suggesting potential symptoms or concerns. The presence of a lung  
mass on CT imaging is highly suggestive of cancer. Cancer Progression | Both <brief reasoning  
trace with explanation for label selection> |<label> The patient has a history of chest imaging  
(CT chest) performed on 2017-05-25 and 2017-06-13. The CT scans show a mass in the left  
lung. The patient also has a history of ER visits in 2011 and 2016, suggesting potential  
symptoms or concerns. The presence of a lung mass on CT imaging is highly suggestive of  
cancer. Cancer Progression | Both <brief reasoning trace with explanation for label selection> |  
<label> The patient has a history of chest imaging (CT chest) performed on 2017-05-25 and

2017-06-13. The CT scans show a mass in the left lung. The patient also has a history of ER visits in 2011 and 2016, suggesting potential symptoms or concerns. The presence of a lung mass on CT imaging is highly suggestive of cancer. Cancer Progression | Both <brief reasoning trace with explanation for

**no image: [INCORRECT]** <reasoning trace with explanation for label selection> | <label> The patient has a history of chest imaging (SR, CR, OT, CT) performed in 2011 and 2016, showing no clear evidence of malignancy or significant pathology. The patient also has a history of ER visits in 2011, 2016, and 2017, suggesting potential symptoms or concerns. However, there is no documented evidence of cancer diagnosis, treatment, or follow-up imaging specifically related to a cancer diagnosis. The cytology report from 2016 is normal, and the HPV test is negative. The imaging findings in 2017 show a CT scan of the chest, but the report is not provided. Without a confirmed cancer diagnosis or specific findings suggestive of cancer progression in the provided timeline, the most consistent diagnosis with the imaging differential is "Neither". Neither

**no radiology report: [INCORRECT]** <reasoning trace with explanation for label selection> | <label> The patient has a history of multiple emergency room visits, including chest imaging (CT chest) in 2017. The imaging findings are not explicitly stated, but the presence of multiple ER visits and chest imaging suggests a possible underlying respiratory issue. The patient also has a history of asthma (implied by the use of montelukast). The chest imaging findings are not provided, but the history of ER visits and potential asthma could point towards pneumonitis or infection. The lack of specific findings in the provided images makes it difficult to definitively label, but the history of ER visits and chest imaging raises suspicion for a respiratory condition. Pneumonitis | Both | Cancer Progression | Neither The patient has a history of multiple emergency room visits, including chest imaging (CT chest) in 2017. The imaging findings are not explicitly stated, but the presence of multiple ER visits and chest imaging suggests a possible underlying respiratory issue. The patient also has a history of asthma (implied by the use of montelukast). The chest imaging findings are not provided, but the history of ER visits and potential asthma could point towards pneumonitis or infection. The lack of specific findings in the provided images makes it difficult to definitively label, but the history of ER visits and chest imaging raises suspicion for a respiratory condition. Pneumonitis | Both | Cancer Progression | Neither The patient has a history of multiple emergency room visits, including chest imaging (CT chest) in 2017. The imaging findings are not explicitly stated, but the presence of multiple ER visits and chest imaging suggests a possible underlying respiratory issue. The patient also has a history of asthma (implied by the use of montelukast). The chest imaging findings are not provided, but the history of ER visits and potential asthma could point towards pneumonitis or infection. The lack of specific findings in the provided images makes it difficult to definitively label, but the history of ER visits and chest imaging raises suspicion for a respiratory condition. Pneumonitis | Both | Cancer Progression | Neither The patient has a history of multiple emergency room visits, including chest imaging (CT chest) in 2017. The imaging findings are not explicitly stated, but the presence of multiple ER visits and chest imaging suggests a possible underlying respiratory issue. The patient also has a history of asthma (implied by the use of montelukast). The chest imaging findings are not provided, but the history of ER visits and potential asthma could point towards pneumonitis or infection. The lack of specific findings in the provided images makes it difficult to definitively label, but the history of ER visits and chest imaging raises suspicion for a respiratory condition. Pneumonitis | Both | Cancer Progression | Neither The patient has a history of multiple emergency room visits, including chest imaging (CT chest) in 2017. The imaging findings are not explicitly stated, but the presence of multiple ER visits and chest imaging suggests a possible underlying respiratory issue. The patient also has a history of asthma (implied by the use of montelukast). The chest imaging findings are not provided, but the history of ER visits and potential asthma could point towards pneumonitis or infection. The lack of specific findings in the provided images makes it difficult to definitively label, but the history of ER visits and chest imaging raises suspicion for a respiratory condition. Pneumonitis | Both | Cancer Progression | Neither The patient has a history of multiple emergency room visits, including chest imaging (CT chest) in 2017. The imaging findings are not explicitly stated, but the presence of multiple ER visits and chest imaging suggests a possible underlying respiratory issue. The patient also has a history of asthma (implied by the use of montelukast). The chest imaging findings are not provided, but the history of ER visits and potential asthma could point towards pneumonitis or infection. The lack of specific findings in the provided images makes it difficult to definitively label, but the history of ER visits and chest imaging raises suspicion for a respiratory condition. Pneumonitis | Both | Cancer Progression | Neither



respiratory condition. Pneumonitis | Both | Cancer Progression | Neither The patient has a history of multiple emergency room visits, including chest imaging (CT chest) in 2017. The imaging findings are not explicitly stated, but the presence of multiple ER visits and chest imaging suggests a possible underlying respiratory issue. The patient also has a history of asthma (implied by the use of montelukast). The chest imaging findings are not provided, but the history of ER visits and potential asthma could point towards pneumonitis or infection. The lack of specific findings in the provided images makes it difficult to definitively label, but the history of ER visits and chest imaging raises suspicion for a respiratory condition. Pneumonitis | Both | Cancer Progression | Neither The patient has a history of multiple emergency room visits, including chest imaging (CT chest) in 2017. The imaging findings are not explicitly stated, but the presence of multiple ER visits and chest imaging suggests a possible underlying respiratory issue. The patient also has a history of asthma (implied by the use of montelukast). The chest imaging findings are not provided, but the history of ER visits and potential asthma could point towards pneumonitis or infection. The lack of specific findings in the provided images makes it difficult to definitively label, but the history of ER visits and chest imaging raises suspicion for a respiratory condition. Pneumonitis | Both | Cancer Progression | Neither The patient has a history of multiple emergency room visits, including chest imaging (CT chest) in 2017. The imaging findings are

**100 axial images (no timeline): [INCORRECT] FINDINGS:** [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_1 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_2 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_3 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_4 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_5 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_6 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_7 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_8 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_9 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_10 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_11 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_12 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_13 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_14 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The visualized bones are normal. [1978-12-11 00:00] |  
FINDINGS\_IMAGING\_CT\_CHEST\_15 - The lungs are clear. - The heart is normal in size. - The mediastinum is unremarkable. - The

**Model:** google/medgemma-4b-it

**middle image from each view:** **[INCORRECT]** The patient has a history of chest pain and visits to the ER. The imaging shows a large, dense mass in the chest, which could be a tumor. The patient also has a history of asthma, which could be related to the chest pain. <Both>

**middle axial image:** **[INCORRECT]** The patient has a history of chest pain and visits to the ER. The imaging shows a chest X-ray and CT scans of the chest and whole body. There is no mention of cancer or infection in the timeline. <Both>

**no image:** **[INCORRECT]** The patient has a history of chest pain and visits to the ER. The imaging shows multiple chest X-rays, CT scans, and PET scans over a period of time. There is no mention of any specific diagnosis or treatment. <Neither>

**no radiology report:** **[INCORRECT]** The provided images are chest X-rays. The images show a clear, round, white structure with a central black area. This is consistent with a pneumothorax, which is air in the pleural space. The presence of a "sunburst" pattern in the lung fields is also consistent with pneumothorax. The patient has a history of ER visits, suggesting possible respiratory distress. <Both>

**100 axial images (no timeline):** **[INCORRECT]** The images show a large, homogenous, white mass occupying the majority of the chest cavity. This is highly suggestive of a large mass, which could be a tumor. The presence of a "sunburst" pattern of radiating lines is also consistent with a mass effect. Given the imaging findings, the most likely diagnosis is cancer progression. Cancer Progression



## Subtask: pneumonitis\_infection\_discussed

### Question:

Based on the provided medical history, cancer evidence, and imaging findings, is there sufficient diagnostic ambiguity to warrant presentation of this case at a thoracic tumor board to discuss differentiation between radiation pneumonitis and infection?

**Correct Answer:** No

### Model: OpenGVLab/InternVL3\_5-8B

**middle image from each view:** [INCORRECT] <The imaging findings and clinical history indicate a complex case with potential differential diagnoses including radiation pneumonitis and infection. The presence of a large pelvic mass and associated lung findings necessitates further expert evaluation.> | Yes

**middle axial image:** [CORRECT] <The provided medical timeline does not mention any specific evidence of radiation pneumonitis or infection. The imaging findings and clinical assessments focus on a pelvic mass and potential lung nodules, but there is no direct indication of differential diagnosis between radiation pneumonitis and infection. Therefore, there is no diagnostic ambiguity to warrant a thoracic tumor board discussion for this specific case.> | No

**no image:** [INCORRECT] <The patient's medical timeline indicates a complex case involving a large pelvic mass with characteristics suggestive of a sarcoma. Imaging findings include a heterogeneous enhancing mass with central necrosis and peripheral enhancement, which could be indicative of radiation pneumonitis if the patient had undergone radiation therapy. However, the timeline does not explicitly mention radiation therapy. The differential diagnosis includes pleomorphic undifferentiated sarcoma, chondrosarcoma, or other unspecified sarcomas, and the possibility of metastasis. Given the ambiguity in distinguishing between radiation pneumonitis and infection, and the need for a multidisciplinary approach, presenting this case at a thoracic tumor board is warranted to discuss the differentiation and appropriate management.]> | Yes

**no radiology report:** [INCORRECT] <brief reasoning trace with explanation for label selection> | <label> The patient's medical timeline indicates a complex case involving a bone tumor in the right superior pubic rami and a secondary finding of a lung nodule. Imaging and biopsy results suggest a metastatic adenocarcinoma, with the bone tumor likely being a metastasis from the lung primary. The differential diagnosis includes both radiation pneumonitis and infection, given the patient's history and symptoms. The ambiguity in distinguishing between these conditions, especially considering the patient's recent treatments and symptoms, warrants further discussion at a thoracic tumor board to ensure accurate diagnosis and appropriate management. | Yes

**100 axial images (no timeline):** [INCORRECT] <brief reasoning trace with explanation for label selection> | <label> The imaging findings and clinical history indicate a need for further evaluation to differentiate between radiation pneumonitis and infection. The presence of both radiation therapy and potential infection symptoms creates diagnostic ambiguity. | Yes

### Model: OctoMed/OctoMed-7B

**middle image from each view:** [CORRECT] <think>First, I carefully reviewed the provided patient timeline and imaging findings to understand the clinical context. The patient is a 49-year-old female with a known aggressive bone tumor in the right superior pubic ramus,

confirmed by MRI and CT scans. The imaging shows a large, locally invasive mass with features suggestive of a primary bone sarcoma, such as chondrosarcoma or pleomorphic undifferentiated sarcoma, rather than metastasis. There is also a suspicious lung nodule noted on CT, which raises concern for possible metastatic disease. The key question is whether there is sufficient diagnostic ambiguity to warrant a thoracic tumor board discussion to differentiate between radiation pneumonitis and infection. Radiation pneumonitis typically occurs after radiation therapy and presents with pulmonary infiltrates, cough, and dyspnea, often weeks to months post-radiation. Infection would present with fever, leukocytosis, and possibly infiltrates or consolidation on imaging. However, the patient's timeline does not mention any prior radiation therapy. The imaging findings focus on the pelvic mass and lung nodules, with no mention of pulmonary infiltrates or signs of infection. The lung nodule is described as spiculated, suspicious for primary lung malignancy, not infection. There is no evidence of fever, leukocytosis, or other signs of infection in the provided data. Given the absence of radiation history and the lack of clinical or imaging evidence supporting infection, there is no ambiguity in the diagnosis. The findings strongly suggest a primary bone tumor with possible lung metastasis, and no evidence to support radiation pneumonitis or infection. Therefore, the case does not present sufficient diagnostic ambiguity to require a tumor board discussion for differentiation between these two entities.

</think> <brief reasoning trace with explanation for label selection> | <label> - The patient has a confirmed aggressive bone tumor in the right pelvis with imaging findings consistent with a primary sarcoma. - There is no history of radiation therapy to suggest radiation pneumonitis. - No clinical or imaging evidence of infection (e.g., fever, leukocytosis, pulmonary infiltrates). - The lung nodule is described as spiculated and suspicious for primary malignancy, not infection. - Therefore, there is no diagnostic ambiguity to warrant a thoracic tumor board discussion. </think> <answer> | <label> No </label> </answer>

**middle axial image: [INCORRECT]** <think>First, I need to understand the clinical scenario. The patient is a 49-year-old female with a right superior pubic rami bone tumor. The imaging findings show a large, aggressive mass with features suggesting a primary bone tumor rather than metastasis. The differential includes pleomorphic undifferentiated sarcoma, chondrosarcoma, or other sarcomas. There is also a right middle lobe lung nodule and a rib fracture, but no clear evidence of metastatic disease from the chest CT. The key question is whether there is sufficient ambiguity to warrant a thoracic tumor board discussion to differentiate between radiation pneumonitis and infection. However, the imaging findings and clinical context do not support radiation pneumonitis or infection as the primary concern. The patient has a confirmed aggressive bone tumor with possible lung involvement, but no signs of infection or radiation-related changes. The lung nodule is described as spiculated and suspicious for primary malignancy, not infection. There is no mention of fever, leukocytosis, or other signs of infection. Radiation pneumonitis would typically occur after radiation therapy, which is not mentioned here. The patient's history includes chronic pain and recent worsening, with a biopsy performed showing a primary bone tumor. The lung findings are more consistent with a primary lung malignancy or metastasis rather than infection or radiation pneumonitis. Therefore, the ambiguity between radiation pneumonitis and infection is not present here. The case is clear enough to proceed with staging and treatment planning without needing a tumor board discussion for this differentiation. Hence, the answer is "No" because there is no ambiguity in the imaging or clinical findings to suggest radiation pneumonitis or infection over the primary bone tumor diagnosis.

</think> <brief reasoning trace with explanation for label selection> | <label> - The imaging findings show a large, aggressive bone tumor in the right superior pubic rami with features favoring a primary sarcoma (e.g., chondrosarcoma or pleomorphic undifferentiated sarcoma) over metastasis. - There is a right middle lobe lung nodule described as spiculated and suspicious for primary malignancy, not infection or radiation pneumonitis. - No clinical or imaging evidence supports radiation pneumonitis (e.g., post-radiation changes) or infection (e.g., fever, leukocytosis, infiltrates). - The case is clear enough to proceed with staging and treatment without ambiguity. </brief reasoning trace with explanation for label

selection> | <label> - The explanation must be concise and reference specific evidence from the PATIENT\_TIMELINE. - The label must be one of the allowed output labels (exactly as specified). - Select "No" because there is no ambiguity in the imaging or clinical findings to suggest radiation pneumonitis or infection over the primary bone tumor diagnosis. </label>

**no image: [INCORRECT]** <think>First, I need to determine if there is sufficient diagnostic ambiguity between radiation pneumonitis and infection to warrant a thoracic tumor board discussion. The patient's history and imaging findings are key here. Looking at the patient timeline, the main issue is a bone tumor in the right superior pubic rami, with aggressive features noted on imaging. The differential includes sarcoma, chondrosarcoma, metastasis, and less likely infection. The imaging reports (both CT and MRI) describe a large, destructive lesion with calcifications and soft tissue involvement, but no mention of lung findings related to radiation pneumonitis. The CT chest shows a spiculated nodule in the right middle lobe and another small nodule, which are more suggestive of primary lung malignancy or metastasis rather than radiation pneumonitis. Radiation pneumonitis typically presents with patchy infiltrates or consolidation in the irradiated field, not discrete nodules. There is no history of prior thoracic radiation mentioned, which would be necessary to consider radiation pneumonitis. The patient's symptoms are localized to the pelvis and knee, with no respiratory symptoms or imaging findings indicative of lung infection or pneumonitis. Therefore, the ambiguity between radiation pneumonitis and infection is minimal, and the primary concern is the pelvic bone tumor and its staging. Hence, there is no need for a thoracic tumor board discussion at this stage.</think> <answer>Yes</answer>

**no radiology report: [CORRECT]** <think>First, I carefully reviewed the provided medical history and imaging findings to understand the patient's condition. The patient is a 49-year-old female with a history of chronic right groin and pelvic pain, leading to wheelchair dependence. Imaging shows a large aggressive bone tumor in the right superior pubic ramus with a 2.5 cm right lung nodule. The biopsy results indicated metastatic adenocarcinoma rather than a primary sarcoma. The patient has a family history of cancer and is a former smoker who quit in 2016. She is currently experiencing significant pain and discomfort, which complicates her clinical management. The key question is whether there is sufficient diagnostic ambiguity to warrant a thoracic tumor board discussion to differentiate between radiation pneumonitis and infection. Radiation pneumonitis typically occurs after radiation therapy and presents with pulmonary infiltrates, cough, and dyspnea, often with elevated inflammatory markers. Infection, on the other hand, would present with fever, leukocytosis, and possibly new infiltrates on imaging. In this case, the patient has a known aggressive bone tumor with metastatic lung involvement, which suggests a primary malignancy rather than an infectious process. The imaging findings do not show typical signs of infection such as consolidation or cavitation. Additionally, the patient's symptoms (chronic pain, no acute fever, and no recent antibiotic use) do not strongly support infection. The biopsy confirmed metastatic adenocarcinoma, which aligns with the clinical picture of a primary malignancy with metastases rather than an infectious etiology. Given the biopsy results, imaging findings, and clinical presentation, there is no significant ambiguity to suggest radiation pneumonitis or infection. The diagnosis is clear as metastatic adenocarcinoma with lung metastases. Therefore, there is no need for a thoracic tumor board discussion to differentiate between these two entities.</think> <answer>No</answer>

**100 axial images (no timeline): [CORRECT]** <think>First, I note that the question asks whether there is sufficient diagnostic ambiguity to warrant presentation of this case at a thoracic tumor board to differentiate between radiation pneumonitis and infection. The options are "Yes" or "No." To answer this, I must evaluate the imaging findings and any clinical context provided in the PATIENT\_TIMELINE. However, the image provided is a CT scan of the chest, showing axial slices through the thorax. The scan shows lung parenchyma, mediastinum, and bony structures. The lungs appear mostly clear with no obvious consolidation, ground-glass opacities, or nodules that would suggest infection or radiation pneumonitis. The mediastinum and heart appear normal in size and shape. There is no visible pleural effusion or pneumothorax. The bones show

no acute fractures or lytic lesions. Importantly, the question references a PATIENT\_TIMELINE, but no specific clinical details are provided here. Without clinical data such as symptoms, lab results, or treatment history (e.g., radiation therapy, chemotherapy, or recent infection), it is impossible to determine if there is diagnostic ambiguity. The imaging alone does not show clear signs of radiation pneumonitis (e.g., patchy ground-glass opacities, fibrosis) or infection (e.g., consolidation, cavitation). Therefore, without additional clinical context, the imaging findings are not sufficient to raise diagnostic uncertainty. Hence, the answer must be based solely on the lack of clinical information and imaging findings that would create ambiguity. Since the question asks if there is sufficient ambiguity to warrant tumor board discussion, and no such evidence is present, the answer is "No."

</think> <answer>No</answer>

### Model: Qwen/Qwen3-VL-8B-Instruct

**middle image from each view:** [CORRECT] The provided PATIENT\_TIMELINE details a 49-year-old female with a large, aggressive pelvic bone tumor (right superior pubic rami) and a concurrent lung nodule. The imaging findings (CT and MRI) are consistent with a primary sarcoma (e.g., chondrosarcoma or undifferentiated sarcoma) rather than metastatic disease. The timeline explicitly states that the patient was referred to Medical Oncology for multidisciplinary care, and the radiology reports do not suggest radiation therapy as a prior treatment. Therefore, there is no evidence of radiation pneumonitis or infection to differentiate. The case is not ambiguous in this regard. No

**middle axial image:** [CORRECT] The provided PATIENT\_TIMELINE does not contain any evidence of prior radiation therapy to the thorax or pelvis, nor is there any indication that the patient has received radiation treatment. The imaging findings (CT scan of the chest, abdomen, and pelvis) show a large pelvic mass and pulmonary nodules, but there is no mention of radiation pneumonitis as a differential diagnosis or any history of radiation exposure. The differential diagnosis discussed in the notes (e.g., primary sarcoma, metastasis) does not include radiation pneumonitis, which is typically a complication of prior radiation therapy. Therefore, there is no diagnostic ambiguity to warrant presentation to a thoracic tumor board for differentiation between radiation pneumonitis and infection, as radiation pneumonitis is not a relevant consideration in this case. No

**no image:** [CORRECT] No | The patient's timeline shows a primary pelvic bone tumor with imaging findings consistent with a sarcoma (e.g., aggressive mass, internal matrix, no evidence of radiation exposure or prior thoracic treatment), and no history of thoracic radiation or prior lung disease. The lung nodule is noted as suspicious for primary lung malignancy, not radiation pneumonitis, and there is no evidence of prior thoracic irradiation. Therefore, there is no diagnostic ambiguity between radiation pneumonitis and infection, as neither condition is clinically or radiologically supported.

**no radiology report:** [CORRECT] The patient has a known primary pelvic bone tumor, which was biopsied and later confirmed to be metastatic adenocarcinoma. The imaging (CT scan) shows a 2.5 cm spiculated mass in the right lung, which is consistent with metastatic disease. The question asks whether there is diagnostic ambiguity to differentiate between radiation pneumonitis and infection. However, the patient's history and imaging findings do not suggest a prior radiation therapy to the chest, which is a key factor in radiation pneumonitis. The CT scan shows a spiculated mass, which is more characteristic of a malignant tumor than radiation pneumonitis or infection. The timeline shows the lung nodule was identified after the pelvic tumor was diagnosed, and the biopsy results confirmed metastatic adenocarcinoma. There is no evidence of prior radiation to the chest, and the imaging findings are consistent with metastatic disease, not radiation pneumonitis or infection. Therefore, there is no diagnostic ambiguity to warrant a thoracic tumor board discussion for differentiating between radiation pneumonitis and infection. No

**100 axial images (no timeline): [CORRECT]** The provided imaging series shows a progressive, large, heterogeneous mass in the right upper lobe that is consistent with a primary lung tumor. The mass is not a diffuse infiltrate or ground-glass opacity pattern that would be more suggestive of radiation pneumonitis or infection. Radiation pneumonitis typically presents as a patchy, bilateral or unilateral infiltrate, often with a geographic distribution, and is usually seen in the context of prior radiation therapy. Infection, while it can present as a mass-like consolidation, typically shows more diffuse or lobar consolidation with air bronchograms and may be associated with systemic signs. The imaging findings here are more consistent with a solid mass lesion, which is more indicative of a primary malignancy. There is no evidence of diffuse infiltrates, ground-glass opacities, or other findings that would suggest radiation pneumonitis or infection. Therefore, there is no diagnostic ambiguity to warrant presentation at a thoracic tumor board for differentiation between radiation pneumonitis and infection. No

**Model: google/medgemma-1.5-4b-it**

**middle image from each view: [INCORRECT]** <brief reasoning trace with explanation for label selection> | <label> 1. **\*\*Identify the core question:\*\*** The question asks if there is sufficient diagnostic ambiguity to warrant a thoracic tumor board presentation, specifically regarding differentiation between radiation pneumonitis and infection. 2. **\*\*Scan the timeline for relevant information:\*\*** Look for mentions of lung nodules, chest imaging, and potential diagnoses related to the lung. 3. **\*\*Locate key findings:\*\*** \* On 03/14/2017, a CT scan of the chest, abdomen, and pelvis was performed. \* The report notes a "2.3 cm spiculated nodule in the right middle lobe (3/22)". \* The report further states, "suspicious for primary lung malignancy, especially in the setting of centrilobular emphysema." \* The report also mentions "2 mm pulmonary nodule in the right upper lobe (3/15)". \* The report notes "mild bilateral centrilobular emphysema." \* On 03/19/2017, a follow-up visit notes the patient is referred to the lung cancer clinic. \* On 03/29/2017, a bone scan is performed, and the report notes "Radiopharmaceutical uptake in the right pelvis, consistent with known osseous involvement of pelvic tumor." This suggests the bone scan is likely focused on the pelvic tumor, not the lung nodule. \* On 03/29/2017, a follow-up visit notes the patient is referred to the lung cancer clinic. \* On 03/31/2017, the timeline includes staging information: "c-7th\_AJCC/UICC-M1b (CLINICAL|AJCC 7TH EDITION|M1B)". This indicates metastatic disease, likely from the lung nodule. 4. **\*\*Evaluate the ambiguity:\*\*** The presence of a spiculated lung nodule suspicious for malignancy, coupled with the patient's history of smoking (implied by the mention of emphysema and the nodule), raises significant concern for lung cancer. The report explicitly states the nodule is "suspicious for primary lung malignancy." 5. **\*\*Consider the differential diagnosis:\*\*** While radiation pneumonitis and infection are possibilities, the report's description of the nodule as "spiculated" and "suspicious for primary lung malignancy" strongly points towards a primary lung cancer diagnosis. The mention of emphysema further supports this. The other findings (pelvic tumor, bone scan) are related to the pelvic mass, not the lung nodule. 6. **\*\*Determine if ambiguity warrants a tumor board:\*\*** The report provides a specific finding (spiculated nodule) with a strong suspicion for malignancy (primary lung cancer). While other diagnoses are possible, the description leans heavily towards cancer. The ambiguity is not significant enough to warrant a tumor board discussion focused on differentiating between radiation pneumonitis and infection, as the primary concern is the lung nodule. The report already provides a strong initial assessment. 7. **\*\*Select the label:\*\*** Based on the strong suspicion for primary lung malignancy described in the imaging report, there is not sufficient diagnostic ambiguity to warrant a tumor board presentation focused on differentiating radiation pneumonitis and infection. The primary concern is the lung nodule. Therefore, the answer is "No".<unused95><brief reasoning trace with explanation for label selection> | <label> 1. **\*\*Identify the core question:\*\*** The question asks if there is sufficient diagnostic ambiguity to warrant a thoracic tumor board presentation to differentiate between radiation pneumonitis and infection. 2. **\*\*Scan the timeline for relevant**



information:\*\* Look for mentions of lung nodules, chest imaging, and potential diagnoses related to the lung. 3. \*\*Locate key findings:\*\* \* On 03/14/2017, a CT scan of the chest, abdomen, and pelvis was performed. \* The report notes a "2.3 cm spiculated nodule in the right middle lobe (3/222)". \* The report further states, "suspicious for primary lung malignancy, especially in the setting of centrilobular emphysema." \* The report also mentions "2 mm pulmonary nodule in the right upper lobe (3/15)". \* The report notes "mild bilateral centrilobular emphysema." \* On 03/19/2017, a follow-up visit notes the patient is referred to the lung cancer clinic. \* On 03/29/2017, a bone scan is performed, and the report notes "Radiopharmaceutical uptake in the right pelvis, consistent with known osseous involvement of pelvic tumor." This confirms the pelvic tumor is the primary source of the bone metastasis. \* On 03/29/2017, a follow-up visit notes the patient is referred to the lung cancer clinic. \* On 03/31/2017, the timeline includes staging information: "c-7th\_AJCC/UICC-M1b (CLINICAL|AJCC 7TH EDITION|M1B)". This indicates metastatic disease (M1b). 4. \*\*Evaluate the ambiguity:\*\* The presence of a spiculated lung nodule suspicious for primary lung malignancy, along with emphysema, raises concern for lung cancer. The patient's history of smoking (former) also increases this risk. While radiation pneumonitis and infection are possibilities, the findings are more suggestive of malignancy. The lung nodule is a significant finding that warrants further investigation and discussion, potentially at a tumor board. 5. \*\*Determine if the ambiguity warrants a tumor board:\*\* The lung nodule is a significant finding that requires expert multidisciplinary discussion. The differential diagnosis includes malignancy (primary lung cancer, metastasis from the pelvic tumor), infection, and inflammatory processes. The ambiguity between these possibilities, especially considering the potential for malignancy, makes a tumor board presentation appropriate to discuss the findings and plan further management. 6. \*\*Select the label:\*\* Based on the presence of a suspicious lung nodule and the need for multidisciplinary discussion regarding the differential diagnosis (including malignancy), the answer is "Yes".

**middle axial image: [INCORRECT]** <brief reasoning trace with explanation for label selection>

| <label> 1. \*\*Identify the core question:\*\* The question asks if there is sufficient diagnostic ambiguity to warrant a thoracic tumor board presentation, specifically regarding differentiation between radiation pneumonitis and infection. 2. \*\*Scan the timeline for relevant information:\*\* Look for mentions of lung nodules, chest imaging, and potential diagnoses related to the lung. 3. \*\*Locate key findings:\*\* \* On 03/14/2017, a CT scan of the chest, abdomen, and pelvis was performed. \* The report notes a "2.3 cm spiculated nodule in the right middle lobe (3/222)". \* The report further states, "suspicious for primary lung malignancy, especially in the setting of centrilobular emphysema." \* The report also mentions "2 mm pulmonary nodule in the right upper lobe (3/15)". \* The report notes "mild bilateral centrilobular emphysema." \* On 03/19/2017, a follow-up visit notes the patient is referred to the lung cancer clinic. \* On 03/29/2017, a bone scan is performed, and the report notes "Radiopharmaceutical uptake in the right pelvis, consistent with known osseous involvement of pelvic tumor." This confirms the pelvic tumor is the primary source of the bone metastasis. \* On 03/29/2017, a follow-up visit notes the patient is referred to the lung cancer clinic. \* On 03/31/2017, the timeline includes staging information: "c-7th\_AJCC/UICC-M1b (CLINICAL|AJCC 7TH EDITION|M1B)". This indicates metastatic disease (M1b). 4. \*\*Evaluate the ambiguity:\*\* The presence of a spiculated lung nodule suspicious for primary lung malignancy, along with emphysema, raises concern for lung cancer. The patient's history of smoking (former) also increases this risk. While radiation pneumonitis and infection are possibilities, the findings are more suggestive of malignancy. The lung nodule is a significant finding that warrants further investigation and discussion, potentially at a tumor board. 5. \*\*Determine if the ambiguity warrants a tumor board:\*\* The lung nodule is a significant finding that requires expert multidisciplinary discussion. The differential diagnosis includes malignancy (primary lung cancer, metastasis from the pelvic tumor), infection, and inflammatory processes. The ambiguity between these possibilities, especially considering the potential for malignancy, makes a tumor board presentation appropriate to discuss the findings and plan further management. 6. \*\*Select the label:\*\* Based on the presence of a suspicious lung nodule and the need for multidisciplinary discussion regarding the differential diagnosis (including malignancy), the answer is "Yes".

staging information: "c-7th\_AJCC/UICC-M1b (CLINICAL|AJCC 7TH EDITION|M1B)". This indicates

**no image: [INCORRECT]** <unused94>thought The user wants me to determine if there is sufficient diagnostic ambiguity to warrant a thoracic tumor board presentation based on the provided patient timeline. 1. **\*\*Identify the core question:\*\*** Is there diagnostic ambiguity warranting a thoracic tumor board? 2. **\*\*Scan the timeline for relevant information:\*\*** Look for diagnoses, imaging findings, and clinical assessments related to the patient's condition, specifically focusing on the pelvic tumor and any potential lung involvement. 3. **\*\*Analyze the pelvic tumor:\*\*** \* Diagnosis: Aggressive bone tumor in the right superior pubic rami. \* Imaging: Radiographs show destruction. CT/MRI show a large mass involving the superior pubic ramus, extending into the acetabulum, and involving the obturator neurovascular bundle. \* Biopsy: Tru-cut biopsy performed. Pathology report (pending during the visit, but the note says it appears to be metastatic adenocarcinoma, which is a type of cancer). \* Clinical context: Patient has chronic pain, wheelchair-bound, pain radiating down leg, numbness in arm, sweating. 4. **\*\*Analyze the lung findings:\*\*** \* Diagnosis: Suspicious spiculated nodule (2.3 cm) in the right middle lobe on CT chest (03/14/2017). \* Clinical context: Patient has chronic pain, sweating, and is wheelchair-bound. 5. **\*\*Evaluate the relationship between the findings:\*\*** \* The pelvic tumor is described as "aggressive-appearing" and involves the obturator neurovascular bundle. \* The lung nodule is described as "spiculated" and suspicious for primary lung malignancy. \* The patient has symptoms (pain, sweating, numbness) that could be associated with malignancy. \* The pelvic tumor is described as potentially metastatic, but the pathology report is pending. \* The lung nodule is suspicious for primary lung cancer. \* The question is whether the pelvic tumor could be metastatic \*from\* the lung nodule, or if both are unrelated primary malignancies (pelvic sarcoma and lung cancer), or if the pelvic tumor is a primary sarcoma and the lung nodule is unrelated. 6. **\*\*Assess diagnostic ambiguity:\*\*** \* The pelvic tumor is aggressive and involves neurovascular structures. \* The lung nodule is suspicious for primary lung cancer. \* The patient has symptoms potentially related to malignancy. \* The differential diagnosis for the pelvic tumor includes sarcoma (primary or metastatic), chondrosarcoma, myeloma, lymphoma. \* The differential diagnosis for the lung nodule includes primary lung cancer (adenocarcinoma, squamous cell, etc.) or metastasis from the pelvic tumor. \* The pending pathology report on the pelvic biopsy adds uncertainty. \* The combination of a suspicious lung nodule and a potentially metastatic pelvic tumor raises concern for metastatic disease. \* The ambiguity lies in whether the pelvic tumor is primary or metastatic, and whether the lung nodule is primary or metastatic. This requires further investigation (e.g., PET scan, further imaging, potentially biopsy of the lung nodule) to clarify the origin and extent of the disease. 7. **\*\*Determine if a thoracic tumor board is warranted:\*\*** \* A thoracic tumor board is typically used to discuss primary lung cancers, metastatic disease \*to\* the lung, or complex thoracic malignancies. \* In this case, the primary concern is the pelvic tumor, which \*could\* be metastatic from the lung nodule, or could be a primary pelvic malignancy. \* The lung nodule is suspicious for primary lung cancer. \* The pelvic tumor is aggressive and potentially metastatic. \* The combination of a suspicious primary lung lesion and a potentially metastatic pelvic lesion warrants discussion of metastatic disease patterns, staging, and treatment options, which is the purview of a thoracic tumor board. The board can help determine the best next steps for evaluating the lung nodule and the pelvic tumor. 8. **\*\*Formulate the reasoning:\*\*** The patient has a suspicious lung nodule (2.3 cm spiculated RML nodule) and a large, aggressive pelvic tumor involving neurovascular structures, potentially metastatic. The pending pathology on the pelvic biopsy adds uncertainty. The combination of a potential primary lung malignancy and a potentially metastatic pelvic tumor raises significant diagnostic ambiguity regarding the origin and extent of the disease. This warrants discussion of metastatic patterns and staging, making a thoracic tumor board appropriate. 9. **\*\*Select the label:\*\*** Yes.<unused95><brief reasoning trace with explanation for label selection> The patient has a suspicious lung nodule (2.3 cm spiculated RML nodule) and a large, aggressive pelvic tumor involving neurovascular



**no radiology report: [INCORRECT]** <brief reasoning trace with explanation for label selection>  
| <label> The patient presents with a large, aggressive-appearing bone tumor in the right superior pubic rami, which is confirmed by imaging (MRI and CT). Additionally, she has a suspicious lung nodule identified on CT scan. The patient's history includes chronic pain, which is a common symptom of bone tumors. The differential diagnosis for the pelvic tumor includes primary bone sarcoma, metastatic carcinoma, and less likely infection. The lung nodule raises concern for primary lung cancer or metastasis from the pelvic tumor. The patient's symptoms (pain, numbness in the arm, sweating) and the presence of a lung nodule suggest a potentially advanced stage. The biopsy results are pending, but the initial assessment suggests a possible metastatic adenocarcinoma, which would classify the disease as Stage IV (M1b). The presence of a lung nodule (M1b) indicates distant metastasis, warranting presentation at a thoracic tumor board to discuss the management of the lung nodule and the overall staging and treatment plan. Yes </label>

**Model:** google/medgemma-4b-it

[illegible]

[illegible]

**middle axial image:** **[INCORRECT]** The provided medical history and imaging findings suggest a possible diagnosis of radiation pneumonitis or infection. The imaging shows a mass in the

pelvis, and the patient has a history of radiation exposure. The differential diagnosis includes malignancy and infection. The patient's symptoms and imaging findings are consistent with both radiation pneumonitis and infection. Therefore, the case should be presented at a thoracic tumor board to discuss the differentiation between radiation pneumonitis and infection. <brief reasoning trace with explanation for label selection> | Yes

**no image:** [INCORRECT] Yes

**no radiology report:** [INCORRECT] The provided medical history indicates a 49-year-old female patient with a large, aggressive-appearing bone tumor in the right superior pubic ramus and pelvic bones, along with a lung nodule. The patient has a history of chronic pain and has been wheelchair-bound for a significant period. The imaging findings show a destructive lesion in the right superior pubic ramus, extending into the acetabulum and soft tissues. The patient has been referred to thoracic oncology for evaluation of the lung nodule. The final pathology report revealed metastatic adenocarcinoma. Given the presence of a known primary malignancy (lung cancer) and the metastatic disease in the bone, the question is whether the imaging findings are consistent with radiation pneumonitis or infection. While radiation pneumonitis is a possibility in patients who have received radiation therapy to the chest, the patient's history does not indicate prior radiation exposure. Infection is also a possibility, but the imaging findings are more suggestive of metastatic disease. Therefore, the answer is "No".

**100 axial images (no timeline):** [INCORRECT] The images show a large, well-defined, homogeneous mass in the right upper lobe of the lung. The mass appears to be causing significant compression of the surrounding lung tissue. There is no evidence of infection or inflammation in the surrounding lung tissue. The patient has a history of radiation therapy to the chest. The imaging findings are consistent with radiation pneumonitis. Yes

## Subtask: progression\_assessment\_discussed

### Question:

Based on the provided medical history and cancer evidence, is there ambiguity in radiologic interpretation that warrants presentation of this case at a thoracic tumor board for progression assessment?

**Correct Answer:** No

### Model: OpenGVLab/InternVL3\_5-8B

**middle image from each view:** **[INCORRECT]** <The patient has a history of recurrent nasopharyngeal carcinoma and a separate diagnosis of a right upper lobe adenocarcinoma, identified as a second primary lung cancer. The imaging and pathology reports indicate a spiculated hypermetabolic nodule in the right upper lobe, which was confirmed as adenocarcinoma. The patient's condition involves two distinct malignancies, which may complicate treatment decisions and progression assessment. Given the complexity and the need for multidisciplinary evaluation, presenting this case at a thoracic tumor board for progression assessment is warranted.> | <Yes>

**middle axial image:** **[INCORRECT]** <The patient has a history of recurrent nasopharyngeal carcinoma and a separate diagnosis of a right upper lobe adenocarcinoma, which is a second primary lung cancer. The imaging and pathology reports indicate that the lung nodule is consistent with a primary lung adenocarcinoma. The patient's case involves multiple malignancies, and the presence of a second primary tumor suggests a complex clinical scenario. Given the need for precise treatment planning and the potential for progression, it is reasonable to consider presenting this case at a thoracic tumor board for further assessment and multidisciplinary discussion.> | Yes

**no image:** **[INCORRECT]** <The patient has a history of recurrent nasopharyngeal carcinoma and a separate diagnosis of a right upper lobe adenocarcinoma, which is considered a second primary lung cancer. The imaging and pathology reports indicate that the right upper lobe nodule is FDG avid and was diagnosed as adenocarcinoma. The patient's clinical presentation and imaging findings suggest a complex case with potential ambiguity in radiologic interpretation, particularly regarding the nature of the pulmonary nodules. The note mentions that the case will be discussed at the thoracic oncology tumor board, indicating that there is a need for further expert evaluation.> | <Yes>

**no radiology report:** **[INCORRECT]** <The patient has a history of nasopharyngeal carcinoma with evidence of recurrent disease and the presence of solitary pulmonary nodules. Imaging and biopsy results are pending, and there is suspicion of metastatic disease or infection. The complexity and ambiguity of the radiologic findings, along with the need for further diagnostic workup, suggest that a thoracic tumor board discussion is warranted to assess progression and guide management. | Yes>

**100 axial images (no timeline):** **[CORRECT]** <brief reasoning trace with explanation for label selection> | <label> The CT images show a clear presence of a mass in the left hilum with evidence of lymph node involvement, consistent with a diagnosis of squamous cell carcinoma of the left hilum (T2 N2 M0, Stage IIIA). The images do not indicate significant changes or ambiguities that would impact the staging or treatment plan. Therefore, there is no immediate need for a thoracic tumor board presentation based on this evidence. | No

### Model: OctoMed/OctoMed-7B

**middle image from each view: [INCORRECT]** <think>First, I carefully review the patient timeline and medical records provided. The patient has a history of treated nasopharyngeal carcinoma (NPC) in 2001 with chemoradiation. She now presents with recurrent NPC, classified as T4, involving multiple anatomical structures including the pterygopalatine fossa, orbit, and skull base. Additionally, there is a right upper lobe (RUL) lung nodule diagnosed as adenocarcinoma, which is considered a second primary malignancy. The imaging and pathology findings show that the RUL nodule is FDG-avid, indicating metabolic activity suspicious for malignancy, but the biopsy confirms it is a primary lung adenocarcinoma. The left upper lobe (LUL) nodule is non-FDG avid and less suspicious, possibly a scar. The patient also has a history of pulmonary tuberculosis (TB), which is noted but not directly related to the current malignancies. The key question is whether there is ambiguity in radiologic interpretation that warrants presentation at a thoracic tumor board for progression assessment. The patient has two distinct malignancies: recurrent NPC and a second primary lung adenocarcinoma. The differentiation between these two neoplasms is supported by molecular testing (negative for ALK and ROS1 rearrangements) and immunohistochemistry (positive for TTF-1 and napsinA, consistent with lung primary). The imaging findings also support separate primaries rather than metastasis. Given the complexity of managing two separate malignancies, especially with the patient's history of radiation and TB, and the need for coordinated multidisciplinary care involving head and neck surgery, radiation oncology, and medical oncology, the case would benefit from discussion at a tumor board. This ensures that treatment plans consider both the recurrent NPC and the second primary lung cancer, including potential interactions and sequencing of therapies. Therefore, the presence of two distinct malignancies with complex clinical and radiologic features necessitates a multidisciplinary approach, making the presentation at a thoracic tumor board appropriate.</think> <answer>Yes</answer>

**middle axial image: [INCORRECT]** <think>First, I need to determine if there is ambiguity in the radiologic interpretation that would warrant presentation at a thoracic tumor board for progression assessment. The options are "Yes" or "No". Looking at the patient timeline and provided data: - The patient has a history of pulmonary tuberculosis (ICD9 011.90) and malignant neoplasms including nasopharyngeal carcinoma (ICD9 147.9) and lung adenocarcinoma (ICD9 162.9). This indicates multiple primary cancers or recurrence. - Imaging findings include a hypermetabolic right upper lobe (RUL) nodule (13mm) and a non-hypermetabolic left upper lobe (LUL) nodule (8mm). The RUL nodule is FDG-avid, which can suggest malignancy but is not definitive. The LUL nodule is non-FDG avid and partially necrotic, which may be less suspicious but still requires follow-up. - Pathology from the RUL FNA shows adenocarcinoma consistent with lung primary, and the nasopharyngeal mass is recurrent nasopharyngeal carcinoma. The two cancers are considered separate primaries based on molecular profiles (EBV negative in lung, positive in nasopharynx). - The patient underwent chemoradiation for NPC in 2001, and now has a recurrent tumor (T4) with bony destruction. The lung nodules are under evaluation for progression or new primaries. - The chest CT and PET-CT show the RUL nodule as suspicious but not definitive, and the LUL nodule as possibly a scar. The recommendation is for short-term follow-up or biopsy. - The patient's clinical status includes tachycardia (pulse 120), low BMI (19.079), and recent weight loss (1460.32 kg), which may indicate systemic illness or cancer progression. - The note from the oncologist mentions the need to discuss at thoracic tumor boards, indicating uncertainty in management and progression assessment. Given the presence of multiple suspicious lesions (RUL nodule FDG-avid, LUL partially necrotic), the history of prior cancers, and the need for multidisciplinary input to determine if these are progression of prior disease, new primaries, or infection/inflammation, there is ambiguity in radiologic interpretation. The tumor board would help clarify the nature of these lesions and guide further steps like biopsy or treatment. Therefore, the answer is "Yes" because the radiologic findings are ambiguous and require expert tumor board discussion.</think> <brief reasoning trace with explanation for label selection> | <label> The patient has a complex history of recurrent nasopharyngeal carcinoma

(T4) and a second primary lung adenocarcinoma, with ambiguous findings on imaging (FDG-avid RUL nodule and non-FDG LUL nodule). The differential diagnosis includes progression of prior disease, new primaries, or infection, necessitating multidisciplinary evaluation at a tumor board to resolve diagnostic uncertainty and guide management. </brief reasoning trace with explanation for label selection> | <label> <answer>Yes</answer> </label></think>

**no image: [INCORRECT]** <think>Okay, let's try to figure this out. The question is whether there's ambiguity in the radiologic interpretation that would warrant presenting the case at a thoracic tumor board for progression assessment. The options are Yes or No. First, I need to look at the patient's timeline and the provided medical history. The patient has a history of pulmonary tuberculosis and was treated for nasopharyngeal carcinoma (NPC) in 2001 with chemoradiation. Now, there's a recurrent NPC that's T4, and there's a separate right upper lobe (RUL) adenocarcinoma, which is considered a second primary. There's also a left upper lobe (LUL) nodule that's non-avid on PET, which might be a scar but needs follow-up. The key here is whether the radiologic findings are ambiguous enough to require a tumor board discussion. The patient has two separate malignancies: recurrent NPC and a second primary lung adenocarcinoma. The RUL nodule was FDG-avid, leading to an FNA confirming adenocarcinoma consistent with lung primary. The LUL nodule is non-avid, so it's less suspicious but still under observation. The MRI and PET-CT show a hypermetabolic right nasopharyngeal mass with bony destruction, consistent with recurrent NPC. The chest CT shows the RUL lesion and the LUL nodule. The pathology from the RUL FNA supports lung primary adenocarcinoma. The LUL nodule's non-avid status makes malignancy less likely but not excluded, hence the recommendation for follow-up. Now, considering the need for tumor board discussion: progression assessment would involve evaluating the current status of both cancers, treatment options, and possible interactions. The presence of two separate primaries complicates management. The RUL adenocarcinoma is confirmed, but the LUL nodule's status is uncertain. The recurrent NPC is T4, which is advanced. The tumor board would help in coordinating care, especially since the patient has a complex history and multiple sites of disease. However, the question is about ambiguity in radiologic interpretation. The RUL lesion was FDG-avid and confirmed as a second primary. The LUL nodule is non-avid, so maybe that's not ambiguous. The NPC is recurrent with bony destruction. The imaging findings seem to support the diagnoses, but the LUL nodule's non-avid nature might raise some uncertainty. However, the main issue here is whether the case needs a tumor board for progression assessment. Given the presence of two separate malignancies and the complexity of the case, involving a multidisciplinary team (tumor board) would be prudent to discuss treatment strategies, especially since the patient has a history of radiation and TB, which might affect treatment options. So, even though the radiologic findings might not be ambiguous in isolation, the overall case complexity and the need for coordinated care across different specialties (head and neck, thoracic oncology) would warrant presenting the case at a tumor board. Therefore, the answer is Yes.</think> <brief reasoning trace with explanation for label selection> | <label> Yes </label> **\*\*Explanation\*\***: The patient has a complex oncologic history with recurrent nasopharyngeal carcinoma (T4) and a confirmed second primary lung adenocarcinoma. The presence of two distinct malignancies, along with a non-avid left upper lobe nodule of uncertain significance, necessitates multidisciplinary evaluation. Radiologic findings, while supporting the diagnoses, require tumor board input to coordinate treatment strategies, assess progression, and address the interplay between prior radiation, tuberculosis history, and current disease status. Ambiguity in the non-avid LUL nodule's significance and the need for integrated care across specialties justify tumor board presentation.</think> <answer> Yes </answer>

**no radiology report: [INCORRECT]** <think>First, I will carefully analyze the provided CT scan images and clinical notes to understand the patient's condition and the current clinical scenario. The patient is a 44-year-old female with a history of nasopharyngeal carcinoma treated with chemoradiation in 2001. She now presents with a right nasal mass and bilateral upper lobe



nodules. The CT scan shows a 1.5 cm right upper lobe (RUL) spiculated nodule that is hypermetabolic, and a 1.6 cm left apical nodule that is not hypermetabolic. The Quantiferon test is positive, indicating latent or active tuberculosis infection. The patient is scheduled for a CT-guided biopsy of the hypermetabolic RUL nodule. The clinical team is considering the possibility of recurrence of nasopharyngeal carcinoma or metastatic disease, and the biopsy is planned to confirm the diagnosis. The patient is also undergoing evaluation for potential treatment options, including surgery or systemic therapy. The key question is whether there is ambiguity in the radiologic interpretation that necessitates a thoracic tumor board review for progression assessment.</think> <answer>Yes</answer>

**100 axial images (no timeline): [CORRECT]** <think>First, I observe the CT image provided. It is a cross-sectional axial view of the thorax, showing the lungs, mediastinum, and bony structures. The lungs appear mostly clear with no obvious masses or consolidations. The mediastinum shows normal anatomy without significant widening or lymphadenopathy. The bones, including the vertebrae and ribs, appear intact without lytic or blastic lesions. There is no visible pleural effusion or pneumothorax. Given the lack of visible tumor progression or new findings, and assuming the patient's timeline does not indicate recent changes or concerns that would necessitate a tumor board review, the radiologic interpretation appears straightforward. There is no ambiguity in the imaging findings that would warrant further multidisciplinary discussion at a tumor board. Therefore, based on the provided image and the absence of radiologic evidence suggesting progression or ambiguity, the appropriate answer is "No."</think> <answer>No</answer>

### **Model: Qwen/Qwen3-VL-8B-Instruct**

**middle image from each view: [CORRECT]** The patient has a documented history of two distinct malignancies: recurrent nasopharyngeal carcinoma (NPC) and a separate primary lung adenocarcinoma in the right upper lobe (RUL). The timeline explicitly states that the lung lesion was diagnosed as a "second primary" and that the case was "discussed at Thoracic oncology tumor boards" as part of the management plan. The radiologic findings (PET-CT, CT) were noted to be non-specific for the lung lesion, prompting a biopsy which confirmed adenocarcinoma. The presence of two separate primary malignancies, especially with different molecular profiles (EBV-positive NPC vs. EBV-negative lung adenocarcinoma), is a complex clinical scenario that requires multidisciplinary assessment. The explicit documentation of a tumor board discussion for this case indicates that the interpretation and management plan were deemed complex enough to warrant such a review. Therefore, there is no ambiguity in the radiologic interpretation that would necessitate a new presentation; the case was already presented and discussed. No

**middle axial image: [CORRECT]** The patient has a documented history of two distinct malignancies: recurrent nasopharyngeal carcinoma (NPC) and a separate primary lung adenocarcinoma (RUL). The timeline explicitly states that the lung adenocarcinoma was diagnosed as a "second primary" and that the case was recommended for discussion at "Thoracic oncology tumor boards" (as noted in the progress note from 10/11/2012). The imaging and pathology findings support this dual diagnosis, with separate molecular profiles (EBV-negative lung adenocarcinoma vs. EBV-positive NPC). Given the presence of a second primary malignancy and the explicit recommendation for thoracic tumor board discussion, there is no ambiguity in the radiologic interpretation that would preclude presentation at a thoracic tumor board for progression assessment. The case is already being managed with this multidisciplinary approach. No | No

**no image: [INCORRECT]** The patient has two distinct malignancies: recurrent nasopharyngeal carcinoma (NPC) and a separate right upper lobe (RUL) adenocarcinoma diagnosed as a second primary. The radiologic findings (PET-CT, MRI, CT) are described as non-specific for the RUL nodule, with differential diagnoses including infection or malignancy, and the LUL



nodule is noted as non-hypermetsabolic and possibly scar. The pathology confirms the RUL lesion as a primary lung adenocarcinoma, but the imaging interpretation is ambiguous regarding progression or nature of the LUL lesion. The note explicitly states: "RECOMMEND SHORT TERM FOLLOW UP CHEST CT IN 3-6 MONTHS TO ASSESS PROGRESSION" for the RUL lesion, and "IF THIS LESION IS NOT BIOPSIED, RECOMMEND SHORT INTERVAL FOLLOW UP" for the LUL lesion. The case is already being discussed at both head and neck and thoracic tumor boards, indicating that ambiguity in radiologic interpretation (especially regarding progression or nature of lung lesions) warrants multidisciplinary review. Yes | Yes

**no radiology report:** **[INCORRECT]** The provided timeline documents a complex clinical scenario involving a patient with a history of nasopharyngeal carcinoma (NPC) who presented with a new right nasal obstruction. Imaging revealed a destructive mass in the nasopharynx and two lung nodules. The radiologic interpretation of these findings is explicitly described as ambiguous. Specifically, the note from Dr. Mendenhall on 09/14/2012 states: "The nodules are also necrotic appearing, also probably more consistent with an infection such as reactivation TB, but not entirely eliminating the possibility these could represent metastatic lesions." This directly indicates that the radiologic findings are not definitive and could represent either recurrent NPC metastases or an infectious process (reactivation TB), which was later confirmed by a positive Quantiferon test. This ambiguity in differentiating between metastatic disease and infection is a key reason for the recommendation to present the case at a tumor board. The tumor board is the appropriate forum to discuss such complex, uncertain findings and to determine the optimal diagnostic and therapeutic pathway. Therefore, the radiologic interpretation is ambiguous and warrants presentation at a tumor board. Yes

**100 axial images (no timeline):** **[CORRECT]** The provided PATIENT\_TIMELINE consists solely of a series of identical or nearly identical chest CT images, with no accompanying clinical history, prior imaging reports, treatment records, or radiologist interpretations. There is no evidence of tumor progression, new lesions, or any radiologic findings that would necessitate a thoracic tumor board review. Without any documented clinical context or radiologic changes to assess for progression, there is no ambiguity that warrants board presentation. No | No

### **Model: google/medgemma-1.5-4b-it**

**middle image from each view:** **[INCORRECT]** <brief reasoning trace with explanation for label selection> | <label> The patient has a history of nasopharyngeal carcinoma (NPC) treated with chemoradiation in 2001. She now presents with a right nasal mass and obstruction. Imaging (CT and PET/CT) reveals a large, lobulated soft tissue mass in the right nasopharynx extending into the posterior nasal cavity and orbital fissures, involving the pterygopalatine fossa, sphenoid bone, and clivus. There is also a hypermetabolic 1.5 cm nodule in the right upper lobe of the lung. The patient has a history of tuberculosis treated in the past. The combination of a locally recurrent/metastatic NPC and a lung nodule raises concern for malignancy. The lung nodule is hypermetabolic on PET, which is concerning, although it could also represent an infection. The nasopharyngeal mass is also hypermetabolic, consistent with recurrent cancer. Given the high suspicion for malignancy in both the lung and the nasopharynx, and the potential for metastatic disease, presentation at a thoracic tumor board for progression assessment is warranted. The PET/CT findings are significant and require expert multidisciplinary evaluation. No | Yes

**middle axial image:** **[INCORRECT]** <brief reasoning trace with explanation for label selection> | <label> The patient has a history of nasopharyngeal carcinoma (NPC) treated with chemoradiation in 2001. The current presentation includes a right nasal mass and a history of right nasal obstruction. Imaging (CT and PET/CT) reveals a large, lobulated soft tissue mass in the right nasopharynx extending into the posterior nasal cavity and orbital fissures, involving the pterygopalatine fossa, sphenoid bone, and clivus. There is also a hypermetabolic 1.5 cm nodule in the right upper lobe of the lung. The patient has a history of tuberculosis treated in the past. The combination of a locally recurrent/metastatic NPC and a lung nodule raises concern for

malignancy. The lung nodule is hypermetabolic on PET, which is concerning, although it could also represent an inflammatory process. The primary concern is the recurrent NPC, which is likely aggressive given the extent of involvement and the patient's history. The presence of a lung nodule further increases the suspicion of metastatic disease. Therefore, a thoracic tumor board is warranted to discuss the management of both the primary NPC and the lung nodule, including potential biopsy and treatment options. No | <brief reasoning trace with explanation for label selection> | <label> The patient has a history of nasopharyngeal carcinoma (NPC) treated with chemoradiation in 2001. The current presentation includes a right nasal mass and a history of right nasal obstruction. Imaging (CT and PET/CT) reveals a large, lobulated soft tissue mass in the right nasopharynx extending into the posterior nasal cavity and orbital fissures, involving the pterygopalatine fossa, sphenoid bone, and clivus. There is also a hypermetabolic 1.5 cm nodule in the right upper lobe of the lung. The patient has a history of tuberculosis treated in the past. The combination of a locally recurrent/metastatic NPC and a lung nodule raises concern for malignancy. The lung nodule is hypermetabolic on PET, which is concerning, although it could also represent an inflammatory process. The primary concern is the recurrent NPC, which is likely aggressive given the extent of involvement and the patient's history. The presence of a lung nodule further increases the suspicion of metastatic disease. Therefore, a thoracic tumor board is warranted to discuss the management of both the primary NPC and the lung nodule, including potential biopsy and treatment options. Yes |

**no image: [INCORRECT]** <brief reasoning trace with explanation for label selection> | <label> The patient has a history of nasopharyngeal carcinoma (NPC) treated with chemoradiation in 2001. She presents with a right nasal mass and obstruction since 2012. Imaging (CT and MRI) reveals a large, lobulated soft tissue mass in the right nasopharynx extending into the pterygopalatine fossa, involving the right orbital fissures, cavernous sinus, and clivus, with bony destruction. This is highly suspicious for recurrent NPC. Additionally, there are two lung nodules, one with a low SUVmax (1.7) and one with a higher SUVmax (4.4). The PET/CT confirms the hypermetabolic right nasopharyngeal mass and the hypermetabolic right upper lobe lung nodule. The patient has a history of tuberculosis treated in the past. The combination of a hypermetabolic nasopharyngeal mass, lung nodules with varying metabolic activity, and a history of TB raises concern for metastatic disease, although the lung nodules could also represent reactivation TB. The presence of a hypermetabolic mass in the nasopharynx in a patient with a history of NPC is highly concerning for recurrence. The lung nodules also warrant further investigation, potentially including biopsy, given their metabolic activity. The findings are significant and warrant discussion at a tumor board to evaluate the extent of disease, potential treatment options (including biopsy and systemic therapy), and the need for further imaging (like PET/CT, which was already done). <label>Yes</label> <brief reasoning trace with explanation for label selection> | <label> The patient has a history of nasopharyngeal carcinoma (NPC) treated with chemoradiation in 2001. She presents with a right nasal mass and obstruction since 2012. Imaging (CT and MRI) reveals a large, lobulated soft tissue mass in the right nasopharynx extending into the pterygopalatine fossa, involving the right orbital fissures, cavernous sinus, and clivus, with bony destruction. This is highly suspicious for recurrent NPC. Additionally, there are two lung nodules, one with a low SUVmax (1.7) and one with a higher SUVmax (4.4). The PET/CT confirms the hypermetabolic right nasopharyngeal mass and the hypermetabolic right upper lobe lung nodule. The patient has a history of tuberculosis treated in the past. The combination of a hypermetabolic nasopharyngeal mass, lung nodules with varying metabolic activity, and a history of TB raises concern for metastatic disease, although the lung nodules could also represent reactivation TB. The presence of a hypermetabolic mass in the nasopharynx in a patient with a history of NPC is highly concerning for recurrence. The lung nodules also warrant further investigation, potentially including biopsy, given their metabolic activity. The findings are significant and warrant discussion at a tumor board to evaluate the extent of disease, potential treatment options (including biopsy and systemic therapy), and the need for further imaging (like PET/CT, which was already done). <label>Yes</label> <brief

reasoning trace with explanation for label selection> | <label> The patient has a history of nasopharyngeal carcinoma (NPC) treated with chemoradiation in 2001. She presents with a right nasal mass and obstruction since 2012. Imaging (CT and MRI) reveals a large, lobulated soft tissue mass in the right nasopharynx extending into the pterygopalatine fossa, involving the right orbital fissures, cavernous sinus, and clivus, with bony destruction. This is highly suspicious for recurrent NPC. Additionally, there are two lung nodules, one with a low SUVmax (1.7) and one with a higher SUVmax (4.4). The PET/CT confirms the hypermetabolic right nasopharyngeal mass and the hypermetabolic right upper lobe lung nodule. The patient has a history of tuberculosis treated in the past. The combination of a hypermetabolic nasopharyngeal mass, lung nodules with varying metabolic activity, and a history of TB raises concern for metastatic disease, although the lung nodules could also represent reactivation TB. The presence of a hypermetabolic mass in the nasopharynx in a patient with a history of NPC is highly concerning for recurrence. The lung nodules also warrant further investigation, potentially including biopsy, given their metabolic activity. The findings are significant and warrant discussion at a tumor board to evaluate the extent of disease, potential treatment options (including biopsy and systemic therapy), and the need for further imaging (like PET/CT, which was already done). <label>Yes</label> <brief reasoning trace with explanation for label selection> | <label> The patient has a history of nasopharyngeal carcinoma (NPC) treated with chemoradiation in 2001. She presents with a right nasal mass and obstruction since 2012. Imaging (CT and MRI) reveals a

**no radiology report: [INCORRECT]** <brief reasoning trace with explanation for label selection> | <label> The patient has a history of nasopharyngeal carcinoma (NPC) treated with chemoradiation in 2001. She now presents with a right nasal mass and bilateral lung nodules. The right upper lobe nodule is hypermetabolic on PET-CT, suggesting malignancy. The left upper lobe nodule is not hypermetabolic, but is spiculated and 1.6 cm in size. The patient has a positive Quantiferon test, suggesting possible latent tuberculosis. The patient has been admitted for a CT-guided biopsy of the right upper lobe nodule. The radiologist has recommended a biopsy of the right upper lobe nodule. The patient is being admitted for sedation and biopsy. The question asks if there is ambiguity in the radiologic interpretation that warrants presentation at a thoracic tumor board for progression assessment. The radiologic findings (hypermetabolic nodule, spiculated nodule) are concerning for malignancy, and the biopsy is planned. While the left nodule is not hypermetabolic, it is still concerning. The positive Quantiferon test raises the possibility of TB, which could be a differential diagnosis or a co-existing condition. The presence of multiple lung nodules in a patient with a history of NPC raises concern for metastatic disease. The radiologic findings are concerning for malignancy, and a biopsy is planned. The question asks if there is ambiguity in the radiologic interpretation that warrants presentation at a thoracic tumor board for progression assessment. The radiologic findings are concerning for malignancy, and a biopsy is planned. The left nodule is not hypermetabolic, but it is still concerning. The positive Quantiferon test raises the possibility of TB, which could be a differential diagnosis or a co-existing condition. The presence of multiple lung nodules in a patient with a history of NPC raises concern for metastatic disease. The radiologic findings are concerning for malignancy, and a biopsy is planned. The left nodule is not hypermetabolic, but it is still concerning. The positive Quantiferon test raises the possibility of TB, which could be a differential diagnosis or a co-existing condition. The presence of multiple lung nodules in a patient with a history of NPC raises concern for metastatic disease. The radiologic findings are concerning for malignancy, and a biopsy is planned. The left nodule is not hypermetabolic, but it is still concerning. The positive Quantiferon test raises the possibility of TB, which could be a differential diagnosis or a co-existing condition. The presence of multiple lung nodules in a patient with a history of NPC raises concern for metastatic disease. The radiologic findings are concerning for malignancy, and a biopsy is planned. The left nodule is not hypermetabolic, but it is still concerning. The positive Quantiferon test raises the possibility of TB, which could be a differential diagnosis or a co-existing condition. The presence

**100 axial images (no timeline): [INCORRECT] FINDINGS:** [1968-01-26 00:00] | Chest X-ray  
[1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest  
X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] |  
Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26  
00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray  
[1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest  
X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] |  
Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26  
00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray  
[1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest  
X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] |  
Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26  
00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray  
[1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest  
X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] |  
Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26 00:00] | Chest X-ray [1968-01-26

middle axial image: **[INCORRECT]** Yes

[illegible]

followed by multiple specialists. The patient is being followed by multiple specialists. The patient  
is being followed by multiple specialists. The patient is being followed by multiple specialists.  
The patient is being followed by multiple specialists. The patient is being followed by multiple  
specialists. The patient is being followed by multiple specialists. The patient is being followed by  
multiple specialists. The patient is being followed by multiple specialists. The patient is being  
followed by multiple specialists. The patient is being followed by multiple specialists. The patient  
is being followed by multiple specialists. The patient is being followed by multiple specialists.  
The patient is being followed by multiple specialists. The patient is being followed by multiple  
specialists. The patient is being followed by multiple specialists. The patient is being followed by  
multiple specialists. The patient is being followed

**no radiology report: [INCORRECT]** The patient has a history of nasopharyngeal carcinoma (NPC) treated with chemoradiation in 2001. She presented with a right nasal obstruction in 2012, and subsequent imaging revealed a destructive mass eroding the pterygoid plate and inferior sphenoid bone, extending into the orbit and posterior sphenoid sinus. The patient is currently being evaluated for a possible recurrence of the NPC. The imaging findings are concerning for local recurrence, and a biopsy is planned. The patient's anxiety and the complexity of her case warrant a discussion at a thoracic tumor board to determine the optimal management strategy. Therefore, the answer is: Yes

**100 axial images (no timeline): [INCORRECT]** The images show a nodule in the lung. The nodule is present in multiple images, suggesting it is likely a persistent lesion. There is no mention of prior treatment or follow-up imaging. Therefore, further evaluation is warranted. Yes



## Subtask: radiation\_oligoprogression\_answer

### Question:

TODO: Based on the provided medical history, cancer evidence, and imaging findings, is focal radiotherapy recommended for the management of this patient's oligoprogressive disease?

Correct Answer: Yes

### Model: OpenGVLab/InternVL3\_5-8B

**middle image from each view:** [INCORRECT] <brief reasoning trace with explanation for label selection>: The patient has a history of lung malignancy and multiple myeloma, with imaging findings indicating stable lesions in the brain and a new focus of intense hypermetabolism in the left subcarinal region. The presence of oligoprogression suggests that focal radiotherapy could be considered to target the specific area of progression. However, the decision to use focal radiotherapy should be based on a comprehensive assessment of the patient's overall condition and treatment goals. Given the complexity of the patient's case, the appropriateness of focal radiotherapy needs careful consideration. | No

**middle axial image:** [INCORRECT] <brief reasoning trace with explanation for label selection> The patient has a history of multiple myeloma and lung adenocarcinoma, with evidence of oligoprogression. The imaging findings show stable lesions in the brain and a new focus of intense hypermetabolism in the subcarinal region, suggesting progression. Focal radiotherapy is often used to manage oligoprogression in oncology, targeting specific areas of progression while sparing normal tissue. Given the patient's history and the imaging findings, focal radiotherapy appears appropriate for managing the oligoprogression. | <label> Yes

**no image:** [CORRECT] <brief reasoning trace with explanation for label selection> | <label> The patient has a history of lung adenocarcinoma with oligoprogression, as evidenced by the stable lesion in the brain and a new focus of intense hypermetabolism in the subcarinal region on PET-CT. The lesion in the brain is stable, and focal radiotherapy is often considered for such cases to manage oligoprogression. The patient's overall condition and the presence of multiple myeloma complicate the treatment plan, but focal radiotherapy remains a viable option for the brain lesion. | Yes

**no radiology report:** [INCORRECT] <Multiple myeloma and lung cancer are present in the timeline. The patient has undergone various treatments including chemotherapy and bone marrow biopsy. Imaging studies like CT and MRI have been conducted, but there is no specific mention of focal progression or oligoprogression. Given the complexity and the lack of clear evidence of oligoprogression, focal radiotherapy might not be the most appropriate next step without further detailed assessment of progression.> | No

**100 axial images (no timeline):** [CORRECT] <brief reasoning trace with explanation for label selection> | <label> The imaging findings show evidence of oligoprogression, which is typically characterized by a small number of tumor sites progressing despite prior treatment. Focal radiotherapy is often considered appropriate for managing oligoprogression as it targets the specific areas of progression while sparing other regions from additional radiation exposure. This approach is supported by the imaging evidence indicating localized progression. | Yes

### Model: OctoMed/OctoMed-7B



**middle image from each view: [CORRECT]** <think>First, I need to understand the clinical scenario and the question: whether focal radiotherapy is appropriate for oligoprogression in this patient. Oligoprogression refers to the development of a limited number of new lesions in a patient with previously controlled metastatic disease. The decision depends on several factors including the number and location of new lesions, prior treatments, tumor biology, and the patient's overall status. Looking at the provided imaging and clinical data: - The patient has a history of lung adenocarcinoma with brain metastases (previously treated with SBRT, as indicated by the brain MRI findings showing stable lesions). - The PET/CT from 08/03/2016 shows a new focus of intense hypermetabolism in the left subcarinal region with an adjacent ill-defined soft tissue density, suggesting a new or progressing lesion. - The patient has multiple myeloma, which is noted as not in remission, but the primary concern here is the lung cancer progression. - The bone marrow biopsy was performed on 09/05/2016, showing abnormal cells but no specific mention of new bone lesions. - The patient is on afatinib, a targeted therapy for EGFR-mutant lung cancer, indicating prior systemic treatment. - There is no mention of prior radiation to the subcarinal region or elsewhere. - The patient has a pathological fracture of the right humerus (noted in the clinical notes), but this is likely related to myeloma rather than lung cancer. - The brain lesions are stable, and there is no evidence of new brain metastases. - The patient's performance status is stable, with no acute complications from the bone marrow biopsy. Given that the patient has a single new lesion in the subcarinal region (oligoprogression), and no other new lesions are evident, focal radiotherapy could be considered to target this lesion. This approach aims to control the progressing disease while sparing the patient from more extensive systemic therapy. The decision aligns with guidelines for oligoprogressive metastatic lung cancer, where localized treatment can be beneficial if the disease is limited and the patient is fit. However, the presence of multiple myeloma complicates the picture, but the primary malignancy here is lung adenocarcinoma. The patient's prior treatments and the stability of brain lesions support the consideration of focal therapy for the new subcarinal lesion. Therefore, based on the imaging findings of a single new lesion in the subcarinal region and the absence of widespread progression, focal radiotherapy is appropriate.</think> <brief reasoning trace with explanation for label selection> | <label> The patient has a history of lung adenocarcinoma with stable brain metastases and a new subcarinal lesion identified on PET/CT. Oligoprogression is characterized by limited new lesions in a patient with previously controlled metastatic disease. Focal radiotherapy is appropriate for managing oligoprogression when there is a limited number of new lesions, stable systemic disease, and no contraindications. The absence of widespread progression and the patient's stable performance status support this approach. <answer> Yes</answer> </answer></think> <answer> Yes</answer>

**middle axial image: [CORRECT]** <think>First, I need to understand the question: Is focal radiotherapy appropriate for managing oligoprogression in this patient? The patient has a history of lung adenocarcinoma with brain metastases, currently on afatinib, and has multiple myeloma not in remission. The key is to evaluate the imaging findings and clinical context to determine if focal radiotherapy is suitable. Looking at the imaging from August 2016, there is a new focus of intense hypermetabolism in the left subcarinal region with an adjacent ill-defined soft tissue density. This suggests a new or progressing lesion. The patient also has a pathological fracture of the right humerus, which is likely related to metastatic disease given the history of lung cancer and multiple myeloma. Oligoprogression refers to limited sites of disease progression while the rest of the disease remains controlled. In this case, the new subcarinal lesion represents a single site of progression. The patient has already undergone brain radiation (SBRT) for brain metastases, and the current lesion is outside the brain, in the thorax. Focal radiotherapy could be considered for this isolated progression. However, the presence of multiple myeloma complicates the picture. Multiple myeloma can cause lytic bone lesions and pathological fractures, but the subcarinal lesion is more likely related to the lung cancer given the history. The bone marrow biopsy from September 2016 showed abnormalities consistent

with multiple myeloma but no mention of active lung cancer progression in the marrow. The lung cancer itself is not described as progressing except for the new subcarinal lesion. The patient is on afatinib, a targeted therapy for EGFR-mutant lung adenocarcinoma. The new lesion could represent progression despite systemic therapy. Focal radiotherapy is often used for oligoprogression to control isolated metastases and delay further systemic progression. The decision would depend on the patient's overall status, prior treatments, and the feasibility of targeting the lesion. Given the imaging shows a single new lesion in the subcarinal region and no other widespread progression, focal radiotherapy could be appropriate. The patient's prior treatments (brain SBRT, systemic therapy) and the isolated nature of the progression support this approach. There is no evidence of contraindications such as extensive disease or poor performance status mentioned. Therefore, based on the imaging findings of a single new lesion and the clinical context of oligoprogression, focal radiotherapy is a reasonable option.

**brief reasoning trace with explanation for label selection** | **The patient has a history of lung adenocarcinoma with brain metastases and multiple myeloma. Imaging shows a new focus of intense hypermetabolism in the left subcarinal region, suggesting oligoprogression. Focal radiotherapy is appropriate for isolated progression in this context.**

**answer** Yes

**no image: [CORRECT]** First, I need to determine if focal radiotherapy is appropriate for oligoprogression in this patient. Oligoprogression refers to the development of a limited number of new lesions while the rest of the disease remains stable or controlled. The patient has a history of lung adenocarcinoma with brain metastases, currently on afatinib, and has multiple myeloma not in remission. Looking at the imaging findings from August 2016, there is a new focus of intense hypermetabolism in the left subcarinal region with an adjacent ill-defined soft tissue density, suggesting possible progression of the primary lung cancer. The brain lesions noted earlier are stable, as per the August 2016 MRI, with no new lesions. The patient also underwent a bone marrow biopsy in September 2016, indicating active myeloma, which complicates the picture. Focal radiotherapy is typically considered for oligoproliferative disease to target the new lesion(s) while maintaining systemic therapy. However, the presence of active myeloma (evidenced by the bone marrow biopsy findings and elevated beta-2 microglobulin) suggests that the patient's disease is not fully controlled systemically. This could affect the efficacy of focal therapy alone, as the systemic disease might continue to progress. Additionally, the patient is on afatinib, a targeted therapy, which may be controlling the brain lesions but the new subcarinal lesion might indicate resistance or progression. The decision to use focal radiotherapy would depend on the patient's overall status, prior treatments, and the goal of care. However, based solely on the provided timeline, there is no explicit evidence that the patient has been treated for the new subcarinal lesion, nor is there mention of prior radiation to that area. The brain lesions are stable, but the new lesion in the chest is a concern. Given the information, the presence of active myeloma and the new lesion in the lung region suggest that systemic therapy should be optimized before considering focal radiotherapy. However, the question is whether focal radiotherapy is appropriate for oligoprogression. Since the brain lesions are stable and the new lesion is isolated, focal radiotherapy could be considered for oligoprogression, but the active myeloma complicates this decision. However, the timeline does not provide evidence of prior treatment for the new lesion, so it might be a candidate for focal therapy. But the key point is that the patient has multiple myeloma not in remission, which is an active systemic disease. Oligoprogression in the context of active systemic disease may not be ideal for focal therapy alone. However, the question is specifically about oligoprogression management. The patient has a new lesion in the lung (subcarinal) which is oligoproliferative, and the brain lesions are stable. Therefore, focal radiotherapy could be appropriate for the new lesion, assuming it is isolated and the patient is otherwise stable. However, the presence of active myeloma (elevated beta-2 microglobulin, abnormal immunoglobulins) suggests that systemic disease is active, which might make focal therapy less effective. But the question is about oligoprogression, not overall disease control. The answer hinges on whether the new

lesion is isolated and if focal therapy is indicated for that. Given the timeline, the new subcarinal lesion is the only new finding, and the brain lesions are stable. Therefore, focal radiotherapy could be appropriate for oligoprogression. However, the patient's myeloma status complicates this, but the question is specifically about oligoprogression, not the myeloma. The answer would be "Yes" if the new lesion is isolated and focal therapy is indicated. But the presence of active myeloma might contraindicate or complicate focal therapy. However, the question is only about oligoprogression, not the myeloma. Therefore, based on the timeline, focal radiotherapy is appropriate for the new subcarinal lesion as oligoprogression.</think> <brief reasoning trace with explanation for label selection> | <label> The patient has a history of lung adenocarcinoma with stable brain metastases (no new lesions) and a new subcarinal lesion identified on PET-CT. Oligoprogression is defined as isolated new lesions in the context of stable systemic disease. The patient's myeloma is active (elevated beta-2 microglobulin, abnormal immunoglobulins), but the question focuses on oligoprogression management. Focal radiotherapy is appropriate for isolated new lesions to control progression while maintaining systemic therapy. The timeline does not indicate prior treatment for the subcarinal lesion, supporting its consideration for focal therapy. </label> <answer>Yes</answer>

**no radiology report: [CORRECT]** <think>Okay, let's analyze the question about whether focal radiotherapy is appropriate for the management of oligoprogression. The patient has a history of multiple myeloma and lung cancer, with recent imaging and lab work indicating disease progression. The key here is to determine if focal radiotherapy is suitable given the patient's cancer status and treatment history. First, oligoprogression refers to the presence of a limited number of new lesions in a patient with previously controlled disease. In this case, the patient has multiple myeloma and lung cancer, and the imaging findings would need to show isolated progression in a limited number of sites to qualify for oligoprogression. The provided imaging includes CT scans of the chest and pelvis, showing progression of disease in specific areas. The decision for focal radiotherapy depends on the number, size, and location of lesions, as well as the patient's overall status and prior treatments. Focal radiotherapy is generally considered when there are 1-5 new lesions, and the patient is otherwise stable with no widespread progression. The patient's history includes a bone marrow biopsy showing progression, and the imaging shows localized progression in the pelvis and chest. The patient is stable otherwise, with no evidence of widespread metastatic disease. This aligns with the criteria for oligoprogression. Focal radiotherapy could be appropriate to target these isolated lesions while sparing the rest of the body from systemic therapy side effects. However, the decision must also consider the patient's prior treatments, response to previous therapies, and overall prognosis. If the patient has already received extensive systemic therapy and is stable, focal radiotherapy could be a good option. If the disease is more widespread or the patient is not a candidate for further treatment, other options may be considered. Given the information provided, the patient has oligoprogression with localized disease and is a candidate for focal radiotherapy.</think> <answer>Yes</answer>

**100 axial images (no timeline): [CORRECT]** <think>First, I need to understand the question: "Is focal radiotherapy appropriate for the management of oligoprogression?" Oligoprogression refers to the presence of a limited number of progressing lesions in a patient with otherwise stable disease. Focal radiotherapy is a treatment approach that targets specific areas of progression rather than systemic therapy. Next, I must analyze the provided image and any associated clinical data to determine if focal radiotherapy is appropriate. The image appears to be a CT scan showing a cross-sectional view of the pelvis. There are visible implants or hardware, possibly related to prior surgery or treatment. The scan shows bony structures, soft tissues, and some metallic components, but no clear evidence of active tumor progression or metastatic lesions is visible in this single image. However, the question is about oligoprogression, which implies that there is clinical or imaging evidence of a few progressing lesions. The image alone does not provide sufficient information to confirm or deny oligoprogression. The decision on focal radiotherapy would depend on the patient's full clinical

history, including prior treatments, tumor response, and the presence of progressing lesions. Since the question asks specifically about oligoprogression and the appropriateness of focal radiotherapy, and given that the image does not provide definitive evidence of oligoprogression or its absence, I must rely solely on the patient timeline provided. If the patient has documented oligoprogression and the lesions are few and localized, focal radiotherapy could be appropriate. If there is no evidence of oligoprogression or if the disease is more widespread, systemic therapy might be preferred. Without additional clinical data, I cannot definitively conclude. However, the question implies that oligoprogression is present. Therefore, based on the assumption that oligoprogression is documented and localized, focal radiotherapy would be appropriate. Final answer: "Yes"</think> <answer>Yes</answer>

### **Model: Qwen/Qwen3-VL-8B-Instruct**

**middle image from each view: [INCORRECT]** The provided PATIENT\_TIMELINE indicates the patient has a history of multiple myeloma (ICD10CM/C90.00) and lung adenocarcinoma (ICD10CM/C34.90, C34.92). A PET-CT scan on 09/02/2016 revealed a new focus of intense hypermetabolism in the subcarinal region of the mediastinum, which is consistent with oligoprogression. The timeline does not contain any documentation of a prior radiation therapy plan or indication for focal radiotherapy for this specific oligoprogression. The patient's history and current findings do not provide sufficient evidence to support the appropriateness of focal radiotherapy without further clinical context or a treatment plan. No | No

**middle axial image: [CORRECT]** The provided timeline indicates the patient has a history of multiple myeloma and lung adenocarcinoma with metastatic disease. The imaging findings show a stable brain lesion and a new focus of intense hypermetabolism in the subcarinal region on PET-CT, which is consistent with oligoprogression. The question is whether focal radiotherapy is appropriate for managing this oligoprogression. Focal radiotherapy is a standard and appropriate management strategy for oligoprogression in cancer patients. It is used to target new or progressing lesions while sparing the rest of the body from unnecessary radiation. The evidence in the timeline supports this approach: the PET-CT scan identified a new, metabolically active lesion in the subcarinal region, which is a clear sign of progression. The patient's history of prior treatments (including SBRT for brain lesions) and current disease status (multiple myeloma not in remission) make focal radiotherapy a rational and commonly employed option to control this specific site of progression. Therefore, based on the evidence of oligoprogression and standard oncology practice, focal radiotherapy is appropriate. Yes

**no image: [CORRECT]** The patient has a history of lung adenocarcinoma with prior lobectomy and adjuvant chemotherapy, and has developed oligoprogression (a new focus of intense hypermetabolism in the subcarinal region on PET-CT, noted on 09/02/2016). The timeline shows no prior radiotherapy for this new site, and the patient is on afatinib. Focal radiotherapy is a standard management option for oligoprogression in lung cancer to control local disease and potentially improve survival. The evidence supports that focal radiotherapy is appropriate for this scenario. Yes

**no radiology report: [INCORRECT]** No | The patient's medical history and imaging findings do not support the use of focal radiotherapy for oligoprogression. The timeline indicates a diagnosis of multiple myeloma (ICD10CM/C90.00) and lung adenocarcinoma (ICD10CM/C34.92), with a documented stage of 2A for the lung cancer. The imaging series (CT scans of chest, abdomen, pelvis, and spine) and lab results (including bone marrow biopsy) are consistent with a systemic disease process, not a localized, oligoprogessive lesion that would be a candidate for focal radiotherapy. The patient's condition is managed with systemic therapies (lenalidomide, dexamethasone, etc.), and there is no evidence of isolated, measurable disease progression that would warrant focal radiation. Therefore, focal radiotherapy is not appropriate for this patient's management.

**100 axial images (no timeline): [INCORRECT]** The provided PATIENT\_TIMELINE consists solely of a series of grayscale axial CT scan images, progressing from the lower abdomen/pelvis upwards through the thorax to the head. There is no accompanying clinical history, cancer diagnosis, treatment details, or documentation of oligoprogression. The images show anatomical structures without any explicit evidence of tumor, metastasis, or disease progression. Therefore, it is impossible to determine if focal radiotherapy is appropriate for oligoprogression based on the given information. No | No

**Model: google/medgemma-1.5-4b-it**

**middle image from each view: [INCORRECT]** <unused94>thought The user wants me to determine if focal radiotherapy is appropriate for oligoprogression based on the provided patient timeline. 1. **Identify the core question:** Is focal radiotherapy appropriate for oligoprogression? 2. **Define oligoprogression:** Oligoprogression is the recurrence of cancer in multiple sites, but the number of sites is limited (typically 2-5). 3. **Analyze the patient's timeline for evidence of oligoprogression:** **History:** Lung adenocarcinoma (left lower lobectomy), metastatic disease to the brain (2 lesions, SBRT), metastatic disease to the bone (right humerus, pathological fracture), history of multiple myeloma (smoldering). **Imaging (PET/CT 08/03/2016):** Brain: No new lesions, but persistent enhancement in the left thalamus (likely from prior SBRT). Chest: Postsurgical changes from left lobectomy. No new lesions. Abdomen/Pelvis: No new lesions. Musculoskeletal: Postsurgical changes from right humerus ORIF. No new lesions. **Imaging (MRI Brain 08/22/2016):** Brain: Stable size and appearance of the 9 mm peripherally enhancing lesion in the left precentral gyrus. Stable residual enhancement in the anterior left thalamus. No new lesions. **Imaging (CT Chest/Abdomen/Pelvis 08/22/2016):** Chest: No new lesions. Abdomen/Pelvis: No new lesions. **Imaging (Bone Marrow Biopsy 08/06/2016):** Bone Marrow: No new lesions identified. **Imaging (Bone X-rays 08/25/2016):** Right Humerus: No new lesions. Hip: No new lesions. Left Femur: No new lesions. **Other Findings:** No new actionable findings on low-dose CT. No new lesions on PET/CT. No new lesions on MRI Brain. No new lesions on Bone Marrow Biopsy. No new lesions on Bone X-rays. 4. **Evaluate the findings in the context of oligoprogression:** The patient has evidence of disease recurrence in multiple sites (brain, bone, lung, bone marrow), but the number of sites is limited (2 brain lesions, 1 bone lesion, 1 lung lesion, 1 bone marrow lesion). This fits the definition of oligoprogression. 5. **Consider the treatment options for oligoprogression:** **Systemic therapy:** Often the first-line treatment for oligoprogression, especially in patients with limited disease burden and good performance status. **Focal radiotherapy:** Can be considered for oligoprogression, particularly for lesions that are symptomatic, rapidly growing, or in locations where systemic therapy is less effective or contraindicated. It can also be used to consolidate response to systemic therapy. **Surgery:** Generally not indicated for oligoprogression. 6. **Determine if focal radiotherapy is appropriate based on the evidence:** The timeline shows multiple sites of recurrence, but no new lesions are identified on recent imaging (PET/CT, MRI Brain, Bone Marrow Biopsy, Bone X-rays). While systemic therapy is often the primary approach, focal radiotherapy *could* be considered for specific lesions if they were symptomatic or showed signs of progression. However, the timeline doesn't explicitly state any symptomatic lesions or evidence of progression requiring focal treatment. The question asks if focal radiotherapy is *appropriate*, implying a potential indication. Given the limited number of sites (oligoprogression), focal radiotherapy is a potential treatment modality to consider, especially if specific lesions warrant it. The timeline doesn't provide enough information to definitively say "yes" or "no" without more context (e.g., symptoms, specific lesion characteristics, treatment goals). However, the presence of oligoprogression itself makes focal radiotherapy a *possible* and *considered* option, even if systemic therapy is often preferred. 7. **Formulate the reasoning:** The patient has evidence of cancer recurrence in multiple sites (brain, bone, lung, bone marrow), fitting the definition of



oligoprogression. While systemic therapy is often the primary treatment, focal radiotherapy is a potential option for managing oligoprogression, especially for symptomatic or progressive lesions. The provided timeline does not explicitly state a need for focal radiotherapy, but the

**middle axial image: [INCORRECT]** <brief reasoning trace with explanation for label selection>

| <label> The patient has a history of multiple myeloma, which is a cancer of plasma cells. The patient has also had a bone marrow biopsy performed on 2016-09-05. The biopsy was performed to evaluate the patient's multiple myeloma. The biopsy showed abnormal cells consistent with myeloma. The patient has also had a PET-CT scan performed on 2016-09-02. The PET-CT scan showed a new focus of intense hypermetabolism in the left subcarinal region with an adjacent ill-defined soft tissue density. This finding is concerning for malignancy. The patient has also had a brain MRI on 2016-08-23. The brain MRI showed unchanged size and appearance of the 0.9 cm peripherally enhancing lesion in the medial aspect of the left precentral gyrus and the residual enhancement in the region of the anterior left thalamus. These findings are consistent with metastatic disease. The patient has also had a brain MRI on 2016-06-07. The brain MRI showed unchanged size and appearance of the 0.9 cm peripherally enhancing and restricting lesion in the medial aspect of the left precentral gyrus or the persistent enhancement in the region of the anterior left thalamus. These findings are consistent with metastatic disease. The patient has also had a brain MRI on 2016-02-24. The brain MRI showed intense FDG uptake in the visualized cerebral cortex gray matter. This high physiologic background activity reduces the sensitivity of PET for malignant processes. Physiologic FDG uptake is seen in the ocular muscles, salivary glands, oropharynx, and vocal cords. There are no pathologically enlarged or hypermetabolic abdominal, pelvic, or inguinal lymph nodes. The thyroid gland is unremarkable. The patient has also had a PET-CT scan performed on 2016-08-03. The PET-CT scan showed a new focus of intense hypermetabolism in the mediastinum in the subcarinal region with SUV max 11.4. This finding is concerning for malignancy. The patient has also had a PET-CT scan performed on 2016-02-24. The PET-CT scan showed intense FDG uptake in the left subcarinal region with an adjacent ill-defined soft tissue density. This finding is concerning for malignancy. The patient has also had a PET-CT scan performed on 2016-09-02. The PET-CT scan showed a new focus of intense hypermetabolism in the mediastinum in the subcarinal region with SUV max 11.4. This finding is concerning for malignancy. The patient has also had a PET-CT scan performed on 2016-02-24. The PET-CT scan showed intense FDG uptake in the left subcarinal region with an adjacent ill-defined soft tissue density. This finding is concerning for malignancy. The patient has also had a PET-CT scan performed on 2016-08-03. The PET-CT scan showed a new focus of intense hypermetabolism in the mediastinum in the subcarinal region with SUV max 11.4. This finding is concerning for malignancy. The patient has also had a PET-CT scan performed on 2016-02-24. The PET-CT scan showed intense FDG uptake in the left subcarinal region with an adjacent ill-defined soft tissue density. This finding is concerning for malignancy. The patient has also had a PET-CT scan performed on 2016-09-02. The PET-CT scan showed a new focus of intense hypermetabolism in the mediastinum in the subcarinal region with SUV max 11.4. This finding is concerning for malignancy. The patient has also had a PET-CT scan performed on 2016-02-24. The PET-CT scan showed intense FDG uptake in the left subcarinal region with an adjacent ill-defined soft tissue density. This finding is concerning for malignancy. The patient has also had a PET-CT scan performed on 2016-08-03. The PET-CT scan showed a new focus of intense hypermetabolism in the mediastinum in the subcarinal region with SUV max 11.4. This finding is concerning for malignancy. The patient has also had a PET-CT scan performed on 2016-02-24. The PET-CT scan showed intense FDG uptake in the left subcarinal region with an adjacent ill-defined soft tissue density. This finding is concerning for malignancy. The patient has also had a PET-CT scan performed on 2016-09-02. The PET-CT

**no image: [INCORRECT]** <brief reasoning trace with explanation for label selection> | <label>

The patient has a history of multiple myeloma, diagnosed in 2016. The patient has undergone several treatments including chemotherapy (cisplatin and pemetrexed) and radiation therapy



(SBRT) for brain metastases. The patient also has a history of lung adenocarcinoma status post lobectomy. The patient is currently on afatinib for lung cancer. The patient has a history of non-scarring hair loss and xerosis cutis. The patient has a history of smoking. The patient has a BMI of 26.89. The patient has a history of hypertension (BP 133/80) and hyperlipidemia (on colesevelam). The patient has a history of hypercalcemia (Calcium 8.9). The patient has a history of hyperuricemia (Urea nitrogen 18). The patient has a history of hyperphosphatemia (Phosphate not explicitly mentioned but likely elevated given myeloma). The patient has a history of hyperkalemia (Potassium 4.1). The patient has a history of hyperproteinemia (Protein 7.8). The patient has a history of elevated alkaline phosphatase (128). The patient has a history of elevated total bilirubin (1.0). The patient has a history of elevated AST (27) and ALT (29). The patient has a history of elevated LDH (not explicitly mentioned but likely elevated given myeloma). The patient has a history of elevated beta-2 microglobulin (1677). The patient has a history of elevated free light chain ratio (2.9). The patient has a history of elevated IgA (22) and IgG (1630). The patient has a history of elevated IgM (35.8). The patient has a history of elevated M-spike (1.0). The patient has a history of elevated anion gap (7). The patient has a history of elevated creatinine (0.77). The patient has a history of elevated alkaline phosphatase (128). The patient has a history of elevated total protein (7.8). The patient has a history of elevated albumin (3.9). The patient has a history of elevated AST (27) and ALT (29). The patient has a history of elevated total bilirubin (1.0). The patient has a history of elevated beta-2 microglobulin (1677). The patient has a history of elevated free light chain ratio (2.9). The patient has a history of elevated IgA (22) and IgG (1630). The patient has a history of elevated IgM (35.8). The patient has a history of elevated M-spike (1.0). The patient has a history of elevated anion gap (7). The patient has a history of elevated creatinine (0.77). The patient has a history of elevated alkaline phosphatase (128). The patient has a history of elevated total protein (7.8). The patient has a history of elevated albumin (3.9). The patient has a history of elevated AST (27) and ALT (29). The patient has a history of elevated total bilirubin (1.0). The patient has a history of elevated beta-2 microglobulin (1677). The patient has a history of elevated free light chain ratio (2.9). The patient has a history of elevated IgA (22) and IgG (1630). The patient has a history of elevated IgM (35.8). The patient has a history of elevated M-spike (1.0). The patient has a history of elevated anion gap (7). The patient has a history of elevated creatinine (0.77). The patient has a history of elevated alkaline phosphatase (128). The patient has a history of elevated total protein (7.8). The patient has a history of elevated albumin (3.9). The patient has a history of elevated AST (27) and

**no radiology report: [INCORRECT]** <unused94>thought The user wants me to determine if focal radiotherapy is appropriate for oligoprogression based on the provided patient timeline. 1. **\*\*Identify the core question:\*\*** Is focal radiotherapy appropriate for oligoprogression? 2. **\*\*Define oligoprogression:\*\*** Oligoprogression is a type of cancer progression where the tumor burden remains relatively stable (often defined as <20% increase in tumor burden) despite treatment, but the tumor is still growing. 3. **\*\*Analyze the patient's timeline for evidence of oligoprogression:\*\*** \* The patient has a history of lung adenocarcinoma (diagnosed 2016). \* The patient has multiple myeloma (diagnosed 2016). \* The patient has received various treatments including chemotherapy (lenalidomide, sulfamethoxazole/trimethoprim, dexamethasone, loperamide, etc.) and radiotherapy (implied by the CT scans). \* The patient has received bone marrow biopsy (diagnostic bone marrow; biopsy(ies)). \* The patient has received cytogenetics/FISH (myeloma panel). \* The patient has received flow cytometry for

[illegible]

**Model:** google/medgemma-4b-it

[illegible]

