CHEST

Basic Bronchoscopy

Technology, Techniques, and Professional Fees

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Flexible bronchoscopy has evolved over the last few decades, allowing chest physicians to use advanced high-definition scopes to inspect the airways and perform various sampling techniques. Although the techniques of basic bronchoscopic sampling have not changed dramatically, documentation requirements, coding, and billing have become more complex and require a better understanding on the part of the proceduralists and practice administrators. Areas in need of attention include learning about the multiple endoscopy rule, appropriate use of modifiers, and recent changes to the Current Procedural Terminology codes, associated work relative value units for moderate sedation, and therapeutic aspiration of secretions. This article describes basic bronchoscopic procedures and the principles needed for their coding and billing.

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Bronchoscopy has been evolving since Gustav Killian used a rigid endoscope to remove a pork bone from his patient's airway in 1897; Chevalier Jackson, an American surgeon, further advanced the science of bronchoscopy when he mapped the airways using a modified esophagoscope and taught rigid bronchoesophagology widely.[1] In 1967, Dr Shigeto Ikeda from Japan introduced the first flexible fiberoptic bronchoscope that officially launched the modern era of bronchoscopy.

It was Dr Ikeda's invention, the flexible bronchoscope, that led to the basic techniques that are indispensable to the modern-day chest physician, such as airway inspection, BAL, brushing, endobronchial and transbronchial lung biopsy (TBLB), and transbronchial needle aspiration (TBNA). In 1987, the optical fibers in the bronchoscope were replaced with a video camera at its distal tip, leading to improved image quality and allowing for the use of a color video screen, instead of the eyepiece.

Indications for bronchoscopy are myriad and include, among others, lung infiltrates and masses, enlarged mediastinal and hilar lymph nodes, endobronchial lesions, hemoptysis, cough, wheezing, stridor, and therapeutic aspiration of secretions. Although absolute contraindications to bronchoscopy are rare, relative contraindications include uncorrectable bleeding diathesis, unstable respiratory

ABBREVIATIONS: CMS = Centers for Medicare & Medicaid Services; CPT = Current Procedural Terminology; cTBNA = conventional transbronchial needle aspiration; E/M = evaluation and management; EBB = endobronchial biopsy; EBUS = endobronchial ultrasound; TBLB = transbronchial lung biopsy; TBNA = transbronchial needle aspiration; wRVU = work relative value unit

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status, hemodynamic instability, life-threatening cardiac arrhythmias, and myocardial ischemia. Basic diagnostic bronchoscopy is a safe procedure, with < 1% of patients experiencing a major complication and a reported death rate of up to 0.04%.[2]

Bronchoscopic Sampling Techniques

The most basic diagnostic bronchoscopic procedure is inspection with a white light bronchoscope. The procedure is typically performed using moderate sedation and topical anesthetic agents for the upper airways and bronchial tree, and it allows for inspection of the trachea, main bronchi, lobar bronchi, and segmental airways. With smaller bronchoscopes, further subsegmental exploration is possible (ultrathin bronchoscopy). Airway inspection can identify hallmarks of specific diseases, such as mucosal aberrations, increased vascularity, bleeding, endobronchial lesions, and airway stenoses. All bronchoscopic procedures begin with a comprehensive airway examination followed by the basic diagnostic bronchoscopic procedures discussed in the following sections, which are often performed together during one procedural session. Table 1 provides the CPT code descriptors for the basic bronchoscopic procedures and their associated work relative value units (wRVUs).

BAL

BAL is commonly used to obtain samples for cytologic analysis of alveolar epithelial lining fluid as well as culture for presumed infections. It is a safe and easy bronchoscopic procedure to perform and usually well tolerated by even the sickest patients. Although the utility of BAL has been studied in several lung pathologies, it is most established in diagnosing malignancy and infections.

BAL cell count may be useful in eosinophilic diseases involving the lung. A diagnosis can often be confirmed with high clinical suspicion and an elevated eosinophil count on BAL, with or without peripheral blood eosinophilia. Such diseases include acute and chronic eosinophilic pneumonias, tropical eosinophilic pneumonia, and helminthic infections with pulmonary manifestations.[3]

For diffuse lung diseases, a target site is often identified based on examination of chest imaging prior to the procedure.[4] However, during the airway inspection, an appropriate site can sometimes be selected according to the presence of specific findings such as blood, purulent secretions, and mucosal abnormalities.

The bronchoscope is placed into the bronchial segment of choice and advanced to the most distal position until

TABLE 1] Description of Common CPT codes for Basic Bronchoscopic Procedures and Their Associated wRVUs

CPT Code	Description	wRVU 2018
31622	Bronchoscopy, rigid or flexible, including fluoroscopic guidance, when performed; diagnostic, with cell washing, when performed (separate procedure)	2.53
31623	Bronchoscopy, rigid or flexible, including fluoroscopic guidance, when performed; with brushing or protected brushings	2.63
31624	Bronchoscopy, rigid or flexible, including fluoroscopic guidance, when performed; with BAL	2.63
31625	Bronchoscopy, rigid or flexible, including fluoroscopic guidance, when performed; with bronchial or endobronchial biopsy(s), single or multiple sites	3.11
31628	Bronchoscopy, rigid or flexible, including fluoroscopic guidance, when performed; with transbronchial lung biopsy(s), single lobe	3.55
31629	Bronchoscopy, rigid or flexible, including fluoroscopic guidance, when performed; with transbronchial needle aspiration biopsy(s), trachea, main stem and/or lobar bronchus(i)	3.75
31632	Bronchoscopy, rigid or flexible, including fluoroscopic guidance, when performed; with transbronchial lung biopsy(s), each additional lobe (list separately in addition to code for primary procedure)	1.03
31633	Bronchoscopy, rigid or flexible, including fluoroscopic guidance, when performed; with transbronchial needle aspiration biopsy(s), each additional lobe (list separately in addition to code for primary procedure)	1.32
31645	Bronchoscopy, rigid or flexible, including fluoroscopic guidance, when performed; with therapeutic aspiration of the tracheobronchial tree, initial	2.88
31646	Bronchoscopy, rigid or flexible, including fluoroscopic guidance, when performed; with therapeutic aspiration of the tracheobronchial tree, subsequent, same hospital stay	2.78

CPT = Current Procedural Terminology; wRVU = work relative value unit.

it is "wedged" into the airway. This will usually represent a segmental or first subsegmental bronchus. Sterile saline is then flushed through the working channel of the bronchoscope in aliquots and suctioned through the suction port into a specimen trap or into the syringe from which it was flushed. A 2016 prospective randomized study found that manual aspiration into the syringe produces a larger quantity of aspirate compared with wall suction; however, diagnostic yields are similar regardless of the technique used.[5]

The ideal amount of fluid is not known, but the minimum should be 100 mL given in 60-mL aliquots.[6] A larger volume of fluid will decrease the relative amount of airways:alveolar material sampled, because the same bronchial surface will be lavaged, but a larger alveolar area will be sampled. Standardizing the amount of lavage fluid will also aid in standardizing quantitative measurements of the sample. BAL return will vary based on multiple factors, including location of BAL, airway selected, dwell time, permeability, and airway collapse.

Transbronchial Lung Biopsy

Originally performed through a catheter inserted through the nose[7] or via a rigid endoscope,[8] TBLB is now routinely performed through a flexible bronchoscope and is considered a basic diagnostic procedure for the pulmonologist. TBLB has been extensively studied in the diagnosis of sarcoidosis,[9,10] hypersensitivity pneumonitis, malignancy, infections, and interstitial lung disease.[11]

TBLB can be performed with or without fluoroscopic guidance. Although all rates of complications, including pneumothorax, are similar in those who undergo the procedure with or without fluoroscopy,[12] clinical practice has evolved into fluoroscopy being commonplace. The advantage to fluoroscopic guidance is confirmation of the appropriate placement of the forceps as well as possibly detecting immediate postprocedure pneumothorax, negating the need for a postprocedure chest radiograph in asymptomatic patients. The bronchoscope is usually maneuvered into a distal position in the selected airway, and flexible forceps are advanced by the bronchoscopist until there is resistance, presumably having reached the pleura. The forceps should then be retracted 1 to 2 cm by the bronchoscopist and opened by the assistant. The bronchoscopist then advances the forceps forward one-half the distance to the previously encountered resistance area and instructs the assistant to close the forceps. Gentle traction is then applied by the bronchoscopist and the forceps, and the lung tissue can be pulled through the working channel of the bronchoscope. The forceps should never be forced through the bronchoscope, especially while flexed, nor should they be opened while within the working channel because this action may damage the bronchoscope.

The number of biopsy samples taken will depend on the overall condition of the patient and the comfort of the bronchoscopist in performing TBLB. Diagnostic yields can vary based on the underlying pulmonary pathology and on the number of biopsy samples taken. Hypersensitivity pneumonitis, sarcoidosis, and lymphangitic carcinomatosis have the highest yields; while increasing the number of biopsies, 1-3 biopsies vs 6-10 biopsies, have a diagnostic yield of 38% and 69%, respectively.[13] The bronchoscopist should take into account the suspected pathology and the incremental risk of pneumothorax with an increasing number of biopsies when determining the appropriate number to perform. Five to seven biopsies should allow for an acceptable diagnostic yield and an acceptable risk/benefit ratio.[14] The size of forceps used has a significant effect on the size of the biopsy specimens but does not seem to have a significant effect on the diagnostic yield.[15,16]

Transbronchial Needle Aspiration

Conventional transbronchial needle aspiration (cTBNA) is the least-used of the basic bronchoscopic procedures.[17] A lack of appropriate training, unproven concerns regarding the safety of the procedure, and low diagnostic yields in all but the most experienced hands have contributed to its underuse.[18] cTBNA has been studied extensively for the diagnosis and staging of lung cancer,[19] mediastinal and hilar lymph node biopsy, endobronchial disease, submucosal lesions, peripheral nodules, and mediastinal cysts and abscesses.[20]

Today, cTBNA has largely been replaced by endobronchial ultrasound (EBUS)-guided TBNA for mediastinal and hilar lymph node sampling due to real-time visualization and higher diagnostic yield. However, cTBNA continues to be a valuable tool for the bronchoscopist as it is commonly used with fluoroscopy in the diagnosis of peripheral lung lesions.[21] It remains a useful and cost-effective tool for diagnosing endobronchial lesions or masses that cause extrinsic compression of the airway that do not require linear EBUS examination for localization. CT scanning is often

performed prior to the procedure to better delineate the relationship of the structures surrounding the tracheobronchial tree.

Four techniques for cTBNA are available to the bronchoscopist. The bronchoscopists who frequently use cTBNA are likely to have a favored method; however, knowledge of all methods is important as circumstances requiring one to adapt or change techniques are common. The four techniques include: (1) the "jabbing method," in which the needle is extended out of the sheath, and the bronchoscope is held in place while the needle and sheath are "jabbed" forward; (2) the "piggyback method," in which the bronchoscope and extended needle and sheath are moved forward as one apparatus; (3) the" hub-against-the-wall," in which the sheath is extended through the bronchoscope and placed against the bronchial wall at an angle of 45 degrees or greater at the target site, and the needle is advanced through the bronchial wall; and (4) the "cough" method, which is similar in technique to the jabbing method but, to have the needle penetrate the bronchial wall, the patient is asked to cough to provide the necessary force.

Endobronchial Biopsy

Endobronchial biopsy (EBB) is a technique easily used by the bronchoscopist for endobronchial lesions and mucosal biopsies. Diagnoses of malignancy and sarcoidosis are most frequent.

The bronchoscopist visualizes the lesion in the airway and extends open forceps to the lesion and then closes them to grab hold of the lesion. Traction is then applied to the forceps to gather the sample. Alternatively, the bronchoscopist can torque his or her wrist while traction is applied; this method can sometimes allow for a larger specimen to be gathered. The forceps with the specimen can be withdrawn through the working channel of the bronchoscope, or the bronchoscope and forceps can be withdrawn as one unit if larger specimens are obtained. Direct forceps biopsy of a visible central lesion suspected to be malignant had a sensitivity of 74%, as shown in an analysis of 35 studies with a total of 4,507 patients.[22] When combined with cTBNA, the diagnostic yield can be as high as 96%.[18]

Bronchial Brushing

Brushing as a means of cytologic sampling during bronchoscopy has been performed for $>$ 40 years.[23] It is most often used today for sampling of endobronchial lesions, mucosal abnormalities, and peripheral pulmonary lesions, most often in concert with fluoroscopy, radial-probe EBUS, or navigation bronchoscopy. Bronchial brushings have a diagnostic rate of 68% in visible central lesions and 41% in peripheral lesions.[24,25]

The brush is contained within a catheter sheath to protect the brush from contamination as it is advanced through the working channel and to minimize loss of specimen as the brush is retracted. The sheath is advanced until it is outside of the working channel. The brush is then advanced through the catheter and maneuvered back and forth along the lesion several times to maximize cell collection. When sampling is complete, the brush is retracted into the sheath and withdrawn from the bronchoscope. The brush can then be smeared onto a slide for onsite cytologic analysis, agitated in saline or another appropriate medium to release the cytologic material from the brush, or cut directly into a preservative solution.

Cell recovery does not differ with increasing brush sizes,[26] but brushes with individual bristles $<$ 0.1 mm in diameter are able to collect significantly more cells than those with bristles $\geq$ 0.1 mm.[27]

Bronchial brushing is performed in lieu of other techniques when the bronchoscopist is concerned about bleeding, presuming, often incorrectly, that it is safer than other techniques. However, bronchial brushing can produce significant bleeding given the large surface area that the brush comes into contact with.

Bronchial brushing has been introduced into bronchial genomic classifier testing. When a bronchoscopy is performed to diagnose a possible malignant pulmonary lesion in a current or former smoker, a brushing is performed at the normal main stem bronchus. If the bronchoscopic specimens from the primary lesion are negative for malignancy, bronchial genomic classifier testing is then performed on the cytologic specimen obtained from the brush. The test has a high negative predictive value and, when the results are negative, can help avoid additional invasive testing.[28]

Reimbursement

Billing for bronchoscopy, and procedures in general, is a moving target and subject to frequent updates and changes. This situation is largely due to the Centers for Medicare & Medicaid Services (CMS) adapting the Current Procedural Terminology (CPT) codes to accommodate a rapidly growing field. Changes in the CPT codes for EBUS-TBNA, radial EBUS use for

localizing peripheral lesions, and the de-coupling of moderate sedation from the bronchoscopy codes have all been discussed in previous issues of this series.[29,30]

Reimbursement for bronchoscopic procedures has two components: professional for the proceduralist and technical for the hospital or the practice. Technical reimbursement can vary based on the setting in which it is performed: ambulatory vs hospital. The current discussion is related to bronchoscopy in the hospital setting and is focused on professional billing.

CMS reimburses hospitals for procedures performed in the outpatient hospital setting (technical fees) based on Ambulatory Payment Classification Groups. Proper coding and billing for bronchoscopy procedures can be complex, and they require the bronchoscopist to understand concepts specific to endoscopic procedures, use appropriate modifiers, and keep abreast of the ever-changing CPT codes. Precise documentation by the bronchoscopist is also extremely important, as coding relies mostly on the physician's procedure note.

Documentation

Billing and coding are supported by thorough documentation of the techniques and significant findings. Most physicians who perform bronchoscopy document bronchoscopic procedures through an established electronic medical record providing templated procedure notes. The bronchoscopist should carefully document abnormal airway findings and sampling techniques with a focus on noting the laterality, target lobe, and type of specimen taken. Blood loss and complications should also be documented.

When performing forceps biopsies, the proceduralist should document whether the biopsy was performed via fluoroscopic visualization (TBLB) or direct visualization (EBB) and whether the obtained specimen is lung tissue or bronchial wall. With TBNA, the specific structure attempting to be biopsied should be documented such as a lymph node or a lesion within the lung parenchyma.

Multiple Endoscopy Rule

In most bronchoscopy procedures, the bronchoscopist performs multiple sampling techniques such as airway inspection, BAL, and TBLB in a single session. When performing each technique separately, a single technique will be reimbursed fully by the payers. However, when using multiple techniques, only one CPT code is considered primary and fully paid while the rest of the codes are partially paid. The partial payment is determined by payers having designated airway examination (CPT 31622) as the base code in bronchoscopy. The partial payment per code relies on a formula that deducts the reimbursement for the secondary codes from the base code. The following example helps illustrate this reimbursement scheme.

A 56-year-old man with a cough is found to have a dense, right lower lobe (RLL) reticulonodular infiltrate on a CT scan of the chest. The pulmonologist decides a bronchoscopy is warranted, during which she performs an inspection of the airways, a BAL of the lateral segment of the RLL, and seven transbronchial biopsies randomly taken from all segments of the RLL.

In this case, the pulmonologist would bill CPT 31628 for the TBLB and CPT 31624 for the BAL. Note that the CPT code for airway inspection, 31622, is not required because it is built into the other more advanced codes. Let us assume that a particular payer pays the following professional fees: airway inspection CPT 31622, \$150; BAL CPT 31624, \$160; and TBLB CPT 31628, \$190. In this case, TBLB CPT 31628 is considered the primary code because it is the most extensive intervention and is reimbursed fully at \$190. BAL CPT 31624 is secondary, and its reimbursement will be subtracted from the base code (\$160 – \$150 = \$10). Airway inspection, CPT 31622, is considered inherent in the samplings represented by the other two codes (reimbursement, \$0). Fluoroscopic guidance, regardless of whether it is used with TBLB, is bundled into CPT 31628 and not separately billed. The total reimbursement for this procedure is: CPT 31628 \$190 + CPT 31624 \$10 = \$200.

It is important to know that some CPT codes are considered "add-on" and are not subject to the multiple endoscopy rules. For example, CPT 31632 is for TBLB performed in each additional lobe. These codes are usually paid fully on top of the other primary and secondary codes.

In the preceding example, if the pulmonologist had performed TBLB not only in the RLL, but also in the right middle lobe, then the payer would have reimbursed fully for it. If we assume that in the reimbursement for TBLB, each additional lobe code CPT 31632 is \$50, then the aforementioned payment will change to: CPT 31628 \$190 + CPT 31624 \$10 + CPT 31632 \$50 = \$250.

Modifiers in Bronchoscopy

In the coding world, a service or procedure can be further described by using a two-digit CPT modifier.

These modifiers provide additional information about the procedure such as how many physicians worked on the patient, whether the procedure was repeated on the same day for a valid reason, where the procedure was performed on the body, and various other situations. Modifiers provide clarity to the payer on these circumstances and ensure a smooth payment process. The coders usually apply modifiers, but it is imperative for the bronchoscopist to understand them and periodically audit their use with their coding staff. Table 2 details some of the important modifiers for bronchoscopy and related services.

Modifier 59 (distinct procedural service) is applied when separate biopsies are performed on different sites or lesions during the same bronchoscopy procedure. Typically, TBLB and EBB are bundled together when performed on the same location. For instance, when a physician performs TBLB and EBB on a lesion in the RLL, the coding system will only accept the TBLB and will not allow the EBB to be coded. However, if the physician performed these techniques in different locations, say TBLB in the RLL and EBB of a different endobronchial lesion in the left upper lobe bronchus, modifier 59 would then be attached to the EBB code to indicate a separate procedural service in a different area. Documentation must be clear about the varied locations. It should also be noted that different insurance carriers have varying requirements regarding how this modifier is appended, and bronchoscopists and hospital coders should be aware of their local rules.

Modifier 22 (unusual procedural services) indicates that the procedure was difficult, time-consuming, and required services significantly greater than traditional service and, therefore, deserves additional reimbursement (typically increases the reimbursement by 20%-25%). This modifier can be used with bronchoscopy but less commonly with basic bronchoscopic procedures. For instance, bronchoscopies complicated by extensive bleeding requiring considerable extra time to control on the part of the bronchoscopist could be eligible for modifier 22 if documented thoroughly.

TABLE 2] Selected Modifiers in Bronchoscopy Procedures

Modifier	Description
22	Unusual procedural services
25	Significant, and separately identifiable E/M service by the same physician on the same day as the procedure or other service
53	Discontinued procedure
59	Distinct procedural service

E/M = evaluation and management.

Modifier 53 (discontinued procedure) is used to describe a procedure that is halted prior to completion as a result of an unexpected event or extenuating circumstances, placing the patient's welfare at risk. Appending modifier 53 to bronchoscopy requires clear supporting documentation, including that anesthesia was induced (whether local, moderate, deep, or general), the bronchoscope was introduced, and the reason the procedure was discontinued. The reimbursement for procedures billed with modifier 53 is based on how much of the procedure was performed according to the documentation.

Modifier 25 denotes a significant and separate identifiable evaluation and management (E/M) service by the same physician on the same day of the procedure. This scenario is common, in which the pulmonologist performs a consultation that results in performing a bronchoscopy on the referred patient on the same day. The physicians must append modifier 25 to the E/M code to inform the payer that the E/M service was done separately and led to the decision to perform the procedure. Otherwise, the payer may mistake the E/M service for the preoperative health and physical examination that is typically bundled with bronchoscopy.

Recent Changes Affecting Basic Bronchoscopy: Moderate Sedation

On January 1, 2017, CMS reduced the wRVUs of basic bronchoscopy codes by 0.25 to reflect the work of moderate sedation. Moderate sedation provided by the bronchoscopist had previously been bundled into the CPT codes for basic bronchoscopy since 2006 as an inherent part of the service, but CMS noted the trend of moderate sedation being billed by a separate provider, reflecting the increased use of anesthetists in the endoscopy suite, especially for GI procedures.[31] These changes were addressed in detail by Dr Nelson in an October 2017 issue of this series.[29]

If the bronchoscopist provides moderate sedation to a patient aged ≥ 5 years, CPT 99152 can be billed for the first 15 min of sedation and the 0.25 wRVU will be credited to the bronchoscopist. For every 15-min increment of moderate sedation beyond the original 15 min, the bronchoscopist can bill CPT 99153. It should

be noted, however, that there is no further physician reimbursement or physician work granted for billing CPT 99153, only practice expense.

Although unbundling moderate sedation from the basic bronchoscopy codes seemed to address a problem with duplication of payment, it has increased the complexity in coding and billing for bronchoscopy and may lead to higher costs by unintentionally incentivizing the routine use of anesthesia services in the endoscopy suite.

Changes to Basic Bronchoscopy for 2018: Therapeutic Aspiration

The CPT codes for bronchoscopy with therapeutic aspiration of secretions, initial (31645) and (31646) subsequent, has been revised by CMS for 2018.[32] These codes are used to describe removal of copious and tenacious secretions from the airway; the former language that suggested use of these codes for abscess drainage has been removed.

CMS agreed that CPT 31645 and CPT 31646 should be valued greater than CPT code 31622 (airway inspection) and changed its current valuation as follows: CPT code 31645 wRVUs reduced from 2.91 to 2.88, and CPT 31646 wRVUs increased from 2.47 to 2.78.

When an initial bronchoscopy for therapeutic aspiration of secretions is performed, CPT 31645 is used. If a repeat bronchoscopy for therapeutic aspiration of secretions is performed during the same hospital stay and by the same provider or provider group, CPT code 31646 is then used. If repeat bronchoscopies for therapeutic aspiration of secretions are being performed in a nonhospital setting, CPT 31645 can then be used for each procedure.

Conclusions

With the evolution of basic bronchoscopic techniques, procedures that were once too cumbersome to perform and required specific expertise are now routinely used by most chest physicians. As advances in technology lead to changes in our procedural practice patterns, CMS responds with coding changes to reflect these new patterns. Although complex, understanding coding and billing for basic bronchoscopy will optimize hospital and physician reimbursement for procedures as well as help facilitate studies of disease prevalence, treatment, and outcomes.

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