LUDWIG'S ANGINA

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- Bilateral infection of the submandibular space that consists of two compartments in the floor of the mouth(Sublingual space and the submylohyoid space)
- An aggressive, rapidly spreading cellulitis, without lymphadenopathy, with potential for airway obstruction.
- Characterised by a brawny swelling of the submandibular region combined with inflammatory oedema of the mouth.

EPIDEMIOLOGY

Oral floor abscess is a rare disease that can become potentially life-threatening if the inflammatory process spreads to the deep cervical soft tissues and mediastinum.

PATHOGENESIS

- In many cases, the inflammation originates from the lower molars. Less commonly, the disease develops from mucosal injuries in the oral floor, leading to abscess formation in the tongue muscles or connective-tissue spaces of the oral floor.
- The disease can also develop as a sign of impaired host resistance, as in the case of diabetic or immunosuppressed patients(especially children).

ETIOLOGY

- Often caused by a virulent streptococcal infection associated with anaerobic organisms and sometimes with other lesions of the floor of the mouth, such as carcinoma.
- The infection encompasses both sides of the mylohyoid muscle causing oedema and inflammation such that the tongue may be displaced upwards and backwards (giving rise to dysphagia) and subsequently to painful obstruction of the airway.

COMPLICATION

- Cellulitis may extend beneath the deep fascial layers of the neck.
- It may involve the larynx, causing glottic oedema and airway compromise.
- May necessitate Intubation

CLINICAL FEATURES

- Typically resent with fever, chills, and malaise, as well as mouth pain, stiff neck, drooling, and dysphagia, and may lean forward to maximize the airway diameter.
- They may have a muffled voice or be unable to speak at all. Trismus is usually absent unless there is spread into the parapharyngeal space.
- As the illness progresses, breathing may become difficult; stridor and cyanosis are considered ominous signs.

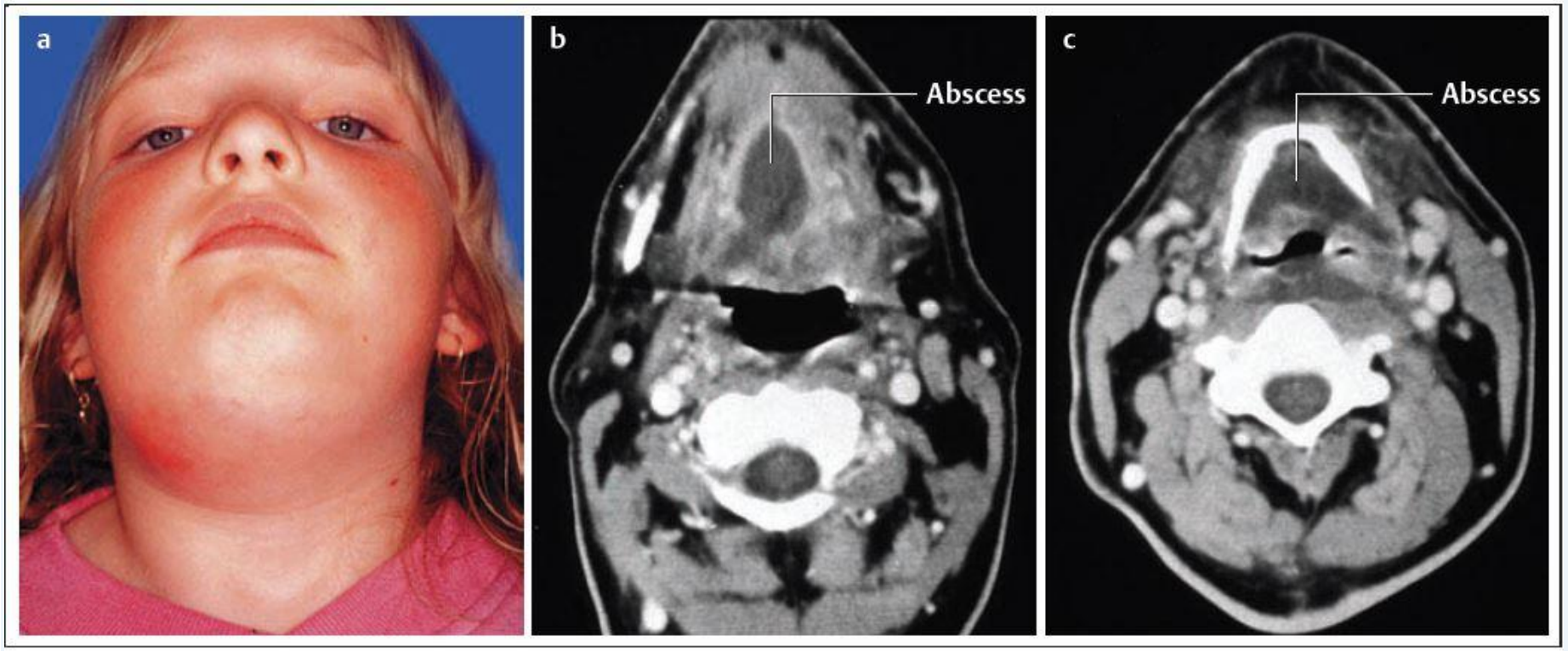
CLINICAL FEATURES

- On physical examination, patients have tender, symmetric, and "woody" induration, sometimes with palpable crepitus, in the submandibular area.
- The mouth is held open by lingual swelling. There is typically no lymphadenopathy.
- The floor of the oropharynx is usually elevated and erythematous, and is tender to palpation. Occasionally, the inflammation extends to the epiglottis.

DIAGNOSIS

- Computed tomography (CT) is the imaging modality of choice for the diagnosis of Ludwig's angina.
- Magnetic resonance imaging (MRI) is useful for delineating soft tissue involvement particularly if septic jugular thrombophlebitis is suspected.

DIAGNOSIS



which originates from the oral floor (**b**) and extends downward

COMPLICATIONS

- Airway compromise is a potential complication of Ludwig's angina, and requires careful monitoring and rapid intervention for prevention of asphyxia or aspiration pneumonia.
- Mediastinitis is a rare complication resulting from spread into the parapharyngeal space and from there to the retropharyngeal space and the superior mediastinum.
- Other complications include cervicofacial necrotizing cellulitis.

MANAGEMENT

- Antibiotic therapy should be instituted as soon as possible using IV broad-spectrum antibiotics, with additional anaerobic cover.
- In advanced cases when the swelling does not subside rapidly with such treatment, a curved submental incision may be used to drain both submandibular triangles. The mylohyoid muscle may be incised to decompress the floor of the mouth and corrugated drains placed in the wound, which is then lightly sutured.
- This operation may be conducted under local anaesthetics.
- Rarely, a tracheostomy may be necessary.

MANAGEMENT

- Timely assessment and management of the airway, and empiric broad-spectrum antibiotics.
- Surgery is not usually necessary since it is uncommon to have a drainable collection in the early stages of infection. Surgical drainage is important once abscesses are identified by CT or MRI.
- While maintenance of an adequate airway is the primary concern and may necessitate urgent tracheostomy, most cases can be managed initially by close observation and intravenous antibiotics.

MANAGEMENT

Airway management

- While maintenance of an adequate airway is the primary concern and may necessitate urgent tracheostomy, most cases can be managed initially by close observation and intravenous antibiotics.
- If cellulitis and swelling continue to advance or if dyspnea occurs, artificial airway control should be gained immediately, before the onset of stridor, cyanosis, and asphyxia.
- Tracheostomy under emergency conditions may be required in more severe cases.

MANAGEMENT

- If airway compromise is suspected, a recommended approach is to perform fiberoptic intubation via the nasal route. Fibroscopic laryngoscopy is carried out to assess the airway and to aid in nasal intubation of an endotracheal tube under direct observation.
- Blind oral or nasotracheal intubation is both traumatic and unsafe in advanced Ludwig's angina because of the potential for inducing severe laryngospasm.
- If intubation is not possible, tracheostomy is the most widely recommended means of surgical airway control, although cricothyroidotomy is advocated by some experts because of a lower complication rate.

MANAGEMENT

Antibiotics

- The treatment of Ludwig's angina has not been evaluated in clinical trials.
- Empiric antimicrobial regimens are based on the expected microbiology, and should be tailored if microbiologic data become available.
- In general, antimicrobial therapy should be continued for two to three weeks until clear evidence of clinical improvement is present, and fever and leucocytosis have subsided. Longer courses are required when complications are present.

MANAGEMENT

Antibiotics Immunocompetent patients

Empiric antibiotic treatment of immunocompetent patients entails broad-spectrum antibiotics with activity against beta-lactamase-producing aerobes and anaerobes, and *Staphylococcus aureus*, including, in some cases, methicillin-resistant *S. aureus* (MRSA).

- Ampicillin-sulbactam (3 g intravenously [IV] every six hours) **or**
- Ceftriaxone plus metronidazole **or**
- Clindamycin plus levofloxacin

MANAGEMENT

Immunocompromised patients — Empiric antibiotic treatment of immunocompromised patients entails broad-spectrum antibiotics with activity against facultative gram-negative rods (including *Pseudomonas aeruginosa*), beta-lactamase-producing aerobes and anaerobes, and *S. aureus*, including in some cases, MRSA.

- Cefepime **plus** metronidazole **or**
- Imipenem **or**
- Meropenem **or**
- Piperacillin-tazobactam

MANAGEMENT

Surgery

- Early surgical decompression is unlikely to locate pus and, at best, may only moderately improve the airway. Abscesses develop relatively late (not usually in the first 24 to 36 hours) and are sometimes difficult to detect clinically.
- If the patient is not responding adequately to antibiotics alone after this initial period, or if fluctuance is detectable or a collection is observed on imaging, needle aspiration or a more formal incision and drainage procedure under general anesthesia should be performed. This should be done with a cuffed tracheostomy in place. Additionally, when a tooth is implicated as the source of infection, it should be extracted.
- When needle aspiration or incision and drainage is indicated, samples should be obtained for Gram stain and cultured for both aerobic and anaerobic microorganisms.

PROGNOSIS

- With the combined use of systemic antibiotics and aggressive surgical intervention in selected patients, the mortality rate for Ludwig's angina has declined dramatically from over 50 percent in the pre antibiotic era to 0 to 4 percent