

DEEP NECK INFECTIONS

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DEEP NECK INFECTIONS

- 20-50% of deep neck infections have no identifiable source
- Spread between the layers of fascias by direct continuity
- Spread via the lymphatic system
- Lymphadenopathy may lead to suppuration and focal abscess formation
- Direct infection by penetrating trauma
- Only 10-15% controlled with antibiotics, without surgery
- Blood cultures
- D.D. cellulitis from abscess

CT scan – MRI

Aspiration: decompress the abscess

aerobic- anaerobic cultures

DEEP NECK INFECTIONS

- Cellulitis: immediate antibiotic therapy
After 24-48h of non response, incision and drainage
- Significant amounts of localized pus:
Early incision and drainage + antibiotics
- Open airway, tracheotomy (?), difficult endotracheal intubation
- Simplest and most direct approach to the space involved
- Re-exploration for presence of undrained pus
- Antibiotics according to results of culture- sensitivity

DEEP NECK INFECTIONS

Complications

- Rupture of the abscess into the airway (aspiration, secondary pneumonia, empyema)
- Bronchial erosion
- Laryngeal spasm
- Mediastinitis
- Metastatic abscess (septic emboli)
- Arterial erosion (internal/ common carotid artery)
- Internal jugular erosion- thrombosis
- Neurologic deficits (hoarseness, Horner syndrome, odynophagia)
- Osteomyelitis
- Septic shock
- Necrotizing fasciitis

DEEP NECK INFECTIONS

Spaces of the neck

I. Spaces involving the entire length of the neck

- A. Superficial: superficial sp.
- B. Deep : retropharyngeal sp.
prevertebral sp.
visceral vascular sp.

II. Suprahyoid spaces

- A. Pharygomaxillary sp.
- B. Submandibular sp.: sublingual (superior)
submaxillary (inferior)
- C. Masticator sp.
- D. Peritonsillar sp.
- E. Temporal sp.
- F. Parotid sp.

III. Infrahyoid space (anterior neck only)

- A. Anterior visceral sp.

DEEP NECK INFECTIONS

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DEEP NECK INFECTIONS

Retropharyngeal space

Also called: Retroesophageal, Retrovisceral, Posterior visceral

- Can spread inferiorly, directly to anterior and posterior mediastinum
- In children or early in adults retropharyngeal abscess: lateral mass (group of nodes, laterally situated, involved in children, tend to regress after 5 y.o.)
- Early abscess: aspiration, intraoral incision + drainage (tonsillectomy position)
- Large abscess or if sepsis persists: external drainage

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Retropharyngeal space (cont.)

Anterior approach (Dean)

- SCM anterior border incision
- SCM + carotid sheath, retracted laterally
- Thyroid cartilage and gland, sup. laryngeal n., sup. thyroid vessels, retracted medially
- Middle + inferior thyroid vessels, omohyoid m. sectioned
- Blunt clamp inserted and opened in the abscess exposed in the posterior pharynx

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DEEP NECK INFECTIONS

Prevertebral space (danger space)

From the base of the skull to the coccyx

- Midline mass, most commonly
- Difficult to differentiate from retropharyngeal abscess, unless the site of origin is known
- External drainage (Dean approach)

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DEEP NECK INFECTIONS

Visceral space or carotid sheath space

- May become involved from all three layers of deep cervical fascia
- Sheath is compact, infections remain localized
- *Erosion of internal jugular vein*  *thrombosis*

Lethargy, severe headaches

Early surgery: if thrombus found, ligation first at clavicular end ( chance of clots or air emboli). Infected segment of the vein removed.

Otherwise ligation at the base of skull, pc. of muscle into the jugular fossa, removable packing (removed in stages after the 5th day).

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DEEP NECK INFECTIONS

Erosion of major arteries

(70% common or internal carotid)

- May result to a fatal hemorrhage (20- 40% mortality regardless of treatment)
- Probable signs: small amounts of blood into the pharynx
bleeding from the ear
ecchymosis of the oral cavity or cervical tissue
- Immediate exploration and ligation (if patient stable, carotid arteriography in the O.R.), cerebrovascular accident

DEEP NECK INFECTIONS

Pharyngomaxillary space

Also called Lateral Pharyngeal space, Peripharyngeal space, Parapharyngeal space

This is the most significant space

- It communicates with all neck spaces
Anterior part (tonsillar fossa, pterygoid m.)
Posterior part (carotid sheath, cranial nerves IX, X, XI, XII, submandibular sp. all structures entering or leaving the tongue, retropharyngeal sp., masseter, parotid sp.)
- Anterior part abscess similar to peritonsillar abscess

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Pharyngomaxillary space (cont.)

- Direct approach beneath the angle of the jaw
- ✓ Blunt instrument or finger along the medial bord of the internal pterygoid upward to the styroid.
- ✓ Through submaxillary fossa (Mosher's approach) elevation of the submaxillary gland, towards the styloid.

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Submandibular space

- Sublingual sp.
- Submaxillary sp. (below the mylohyoid)
 - Submental (medially)
 - Lateral submaxillary (laterally)
- Sublingual abscess, localized, swelling, drained from the floor of the mouth (tongue pushed upward- backward, trismus)
- Invasion of the mylohyoid, submaxillary abscess
- External approach, horizontally to the inferior body of the mandible

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Submandibular space (cont.)

Crodinsky criteria for Ludwig's angina

- Submandibular cellulitis (not abscess) – gangrene with little or no pus
- Bilateral involvement of more than one spaces of the submandibular area
- Connective tissue, muscles, fascias involvement but not glandular structures
- Spread by continuity not by the lymphatic system
- Sepsis
- Life threatening condition
- Requires tracheotomy for airway control

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DEEP NECK INFECTIONS

Masticator space

- Space relatively closed, except superiorly (temporal space)
- Most common complication buccal space involvement
- Marked trismus
- External incision below- behind the angle of the jaw
- Blunt dissection into the abscess
- Communication to bone (subperiosteal abscess)
- Abscess pointing lingually: vertical intraoral incision along the anterior border of the ramus (medial and lateral dissection)
- If drainage not established after 10 days: osteomyelitis

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DEEP NECK INFECTIONS

Peritonsillar space

- The most common deep neck space abscess
- Prolapse of the tonsil and tonsillar fossa

Trismus

Parotid region swelling

- If not early intraoral drainage or tonsillectomy, rapidly spread to pharyngomaxillary space

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DEEP NECK INFECTIONS

Anterior visceral space (anterior neck only)

- Surrounded by visceral fascia from the thyroid to the anterior portion of superior mediastinum
- Drainage via a collar incision or Dean's anterior approach if unilateral
 - upper respiratory obstruction
 - pulmonary infection, edema
 - empyema
 - mediastinitis

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DEEP NECK INFECTIONS

CERVICAL NECROTIZING FACIITIS

Surgical Management

CERVICAL NECROTIZING FACIITIS

Description

- Severe soft tissue infection
- Real emergency, high mortality
- Progressive, rapid necrotizing process of the subcutaneous tissues and facial planes
- Extreme toxicity
- Septic shock syndrome
- Occurs only rarely in the head and neck

CERVICAL NECROTIZING FACIITIS

Description (cont.)

- Secondary to dental, mouth, pharyngeal infections
- 35% idiopathic (absence of known causative factor or portal of entry of bacteria)
- Both sexes, male predominance, age 40- 50
- Risk factors: Immunosuppressive diseases
 - Diabetes
 - HIV infection
 - Chronic alcoholism/ malnutrition
 - Cancer
 - Connective tissue systemic diseases
 - Peripheral vascular disease
- Also in young people without previous history

CERVICAL NECROTIZING FACIITIS

Description (cont.)

- Most often due to:
 1. Group A streptococci + bacteroidess species
 2. Group A streptococci alone
 3. Clostridium species
 4. Proteus mirabilis
 5. Pseudomonas aeruginosa
 6. Klebsiella species
- Once initiated, rapid progression to:

facial spaces	subcutaneous fat
cervical viscera	strap muscles
mediastium	SCM muscle
anterior upper thoracic wall	platysma

CERVICAL NECROTIZING FACIITIS

Signs and symptoms of necrosis

- Infection without response to antibiotic therapy after 24- 48h
- Crepitation, cervical erythema, tenderness
- Sometimes overlaying skin is normal
- Dusky blue skin or red oedematous skin/ cellulitis
- Gas in the soft tissues of the neck
- Disorientation, apathy
- Hypocalcaemia, hyponatremia, hypoproteinemia, dehydration, fat necrosis, saponification
- Fever, leucocytosis
- Decreasing hemoglobin levels (hemolysis)
- Dysphagia, odynophagia, trismus, breathing difficulty
- Presternal/ retrosternal pain

CERVICAL NECROTIZING FACIITIS

Diagnosis

- Non specific diagnostic method
- Emergency CT scan or MRI of the neck
- Emergency CT scan or MRI of the mediastinum
- D.D. between cellulitis and abscess
- Bullus lesions with gas production

CERVICAL NECROTIZING FACIITIS

Non steroid anti-inflammatory agents or steroids

Retrospective trials

- 40% of patients with N.F.
- Reduction of activation of granulocytes and phagocytosis
- Mortality 
- Mediastinitis
- Delay of first consultation

CERVICAL NECROTIZING FACIITIS

Surgical exploration

- Aggressive drainage and debridement of all involved areas (incisions should be carried beyond the limits of infection)
- Excision of necrotic tissues
- Good visualization, complete exposure of tissue planes
- Cultures for pathogenic agents, blood cultures
- Open wound, wound toilet (N/S, betadine, hydrogen peroxide), wound dressings changed 3 times daily

CERVICAL NECROTIZING FACIITIS

Surgical exploration (cont.)

- Intensive care unit admission
- Prolonged intubation if needed, open airway
- Hemodynamic support
- Blood transfusions
- Adjustment of fluids and electrolytes
- Antibiotic support
- CT scan or MRI follow up for complication
- A delay of some hours of the surgical exploration: high mortality, low prognostic
- Hyperbaric oxygen
- Re-exploration and debridement under G.A. every 24- 48h. until the wound shows no evidence of further necrosis

CERVICAL NECROTIZING FACIITIS

Complications

- Mediastinitis (mortality rate >50%)
 - ✓ Upper third, most of the cases, cervical approach sufficient
 - ✓ Under trachea bifurcation: sternotomy, thoracotomy
 - ✓ Surgical exploration delay of some hours: high mortality, low prognostic
- Pericarditis, arrhythmias, myocarditis, pericarditis
- Septic shock
- Renal failure, liver failure
- Perforation oesophagus,
- Respiratory failure, airway obstruction
- Jugular vein thrombophlebitis
- Carotid artery rupture
- Multiorgan failure

CERVICAL NECROTIZING FACIITIS

Case study

CERVICAL NECROTIZING FACIITIS

Case study

Profile

- Woman, 40 years old
- Clinical history (-)
- Immunosuppression (-)

Day of admission

- Cervical erythema, tenderness
- Dysphagia
- 12h history of mild breathing difficulty
- 12h history of retrosternal pain

CERVICAL NECROTIZING FACIITIS

Case study

Day of admission (cont.)

6 d.history of	Angina- tonsilitis (zithromax), sore throat
2 d.history of	Hoarseness- aphonia (arytenoid oedema endoscopically)
	Cervical erythema, fever 37,5
	Dalacin, Zinadol, steroids
24 d.history of	WBC 26.000 80% poly
	Hemoglobin 9.5 (hemolysis)

CERVICAL NECROTIZING FACIITIS

Case study

Day of admission (cont.)

- Pulse rate 80 beats/min
- Blood pressure 110/ 70 mmHg
- WBC 36.000, 39.800, 40.000, hemoglobin 9.5
- Chest XR
- Ultrasound scan of the neck
- Emergency MRI neck + thorax

CERVICAL NECROTIZING FACIITIS

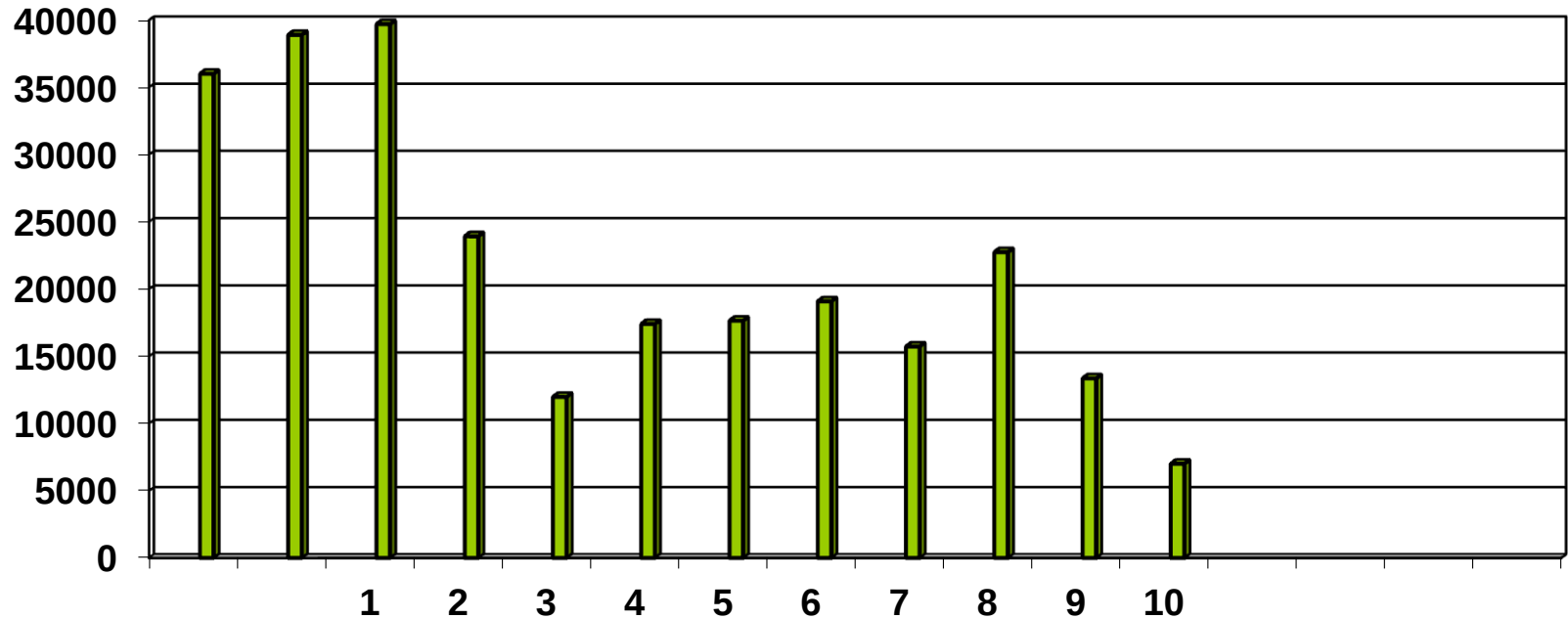
Case study

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CERVICAL NECROTIZING FACIITIS

Case study

WBC diagram



CERVICAL NECROTIZING FACIITIS

Case study



Citius, Altius, Fortius

Thank you for your attention