



Neck Space infections A Case series study

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Abstract:

This article is about the cases of neck space infections presented to the department of E.N.T and HEAD & NECK surgery of Govt.stanley medical college, during a two month period of 15th November 2011 to 15th January 2012. Out of the 8 cases presented to the department, 2 cases were of tuberculous cold abscess. Five cases treated with I&D of which two cases needed preliminary tracheostomy.

CASE 1:

35 yr old lady, known diabetic patient on irregular treatment, presented with swelling below the mandible of 10 days duration with history of fever 10 days.

Clinical findings:

Patient appeared febrile and toxic, with stridor and trismus. There was swelling involving the submandibular region and right parotid area. Examination of oral cavity showed sublingual swelling pushing the tongue upwards. Right premolar molar teeth were diseased (caries teeth).



Figure 1: picture showing infection of submandibular and parotid region with tongue pushed up.

Management:

A preliminary tracheostomy was done initially, followed by incision and drainage through a transverse sub mental incision and the sublingual and sub maxillary spaces connected after dividing the mylohyoid muscle. Serous fluid was drained out. Another separate incision put over the parotid area, and thick pus was drained out. Culture of the pus showed growth of mixed flora. Patient was put on I.V antibiotics with anaerobic coverage and strict glycemc control. Patient improved well and swelling subsided . Tracheostomy closed after 10 days.

CASE 2:

32 yr old female presented with swelling in the anterior aspect of the neck and fever of 1 week duration.

Clinical findings:

Clinical examination of the patient showed torticollis, and a diffuse swelling in the anterior aspect of neck, more on left side, which was warm and tender, moving with deglutition, smooth surface, with shiny skin over the swelling. Lower boarder of the swelling was not palpable. Needle aspiration showed pus coming out from the swelling. A CT scan of neck was taken, which showed abscess involving the strap muscles on the left side of the neck.



Figure 2: picture showing left sided neck abscess obliterating the left.



Figure 3: CT image of the same patient showing the abscess pushing the trachea Supraclavicular area. to opposite side.

Management:

Incision and drainage of the abscess was done, abscess wall biopsy showed granulomatous inflammation. Patient was started on category 1 anti tuberculosis treatment. Patient improved well.

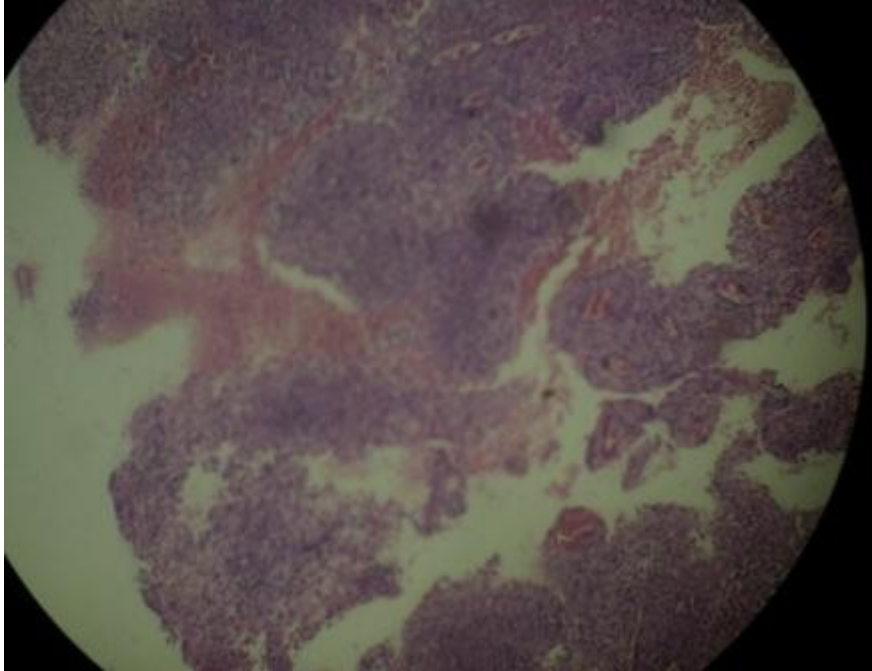


Figure 4: Histopathological smear of the patient showing granulomatous reaction.

CASE 3:

50 yr old male presented with complaints swelling below the mandible and fever of 10 days duration.

Clinical findings:

Clinical examination showed patient having halitosis and trismus, and a large swelling involving the submandibular and sub mental region with pus pointing over the swelling. Examination of oral cavity showed poor oral hygiene and caries teeth.

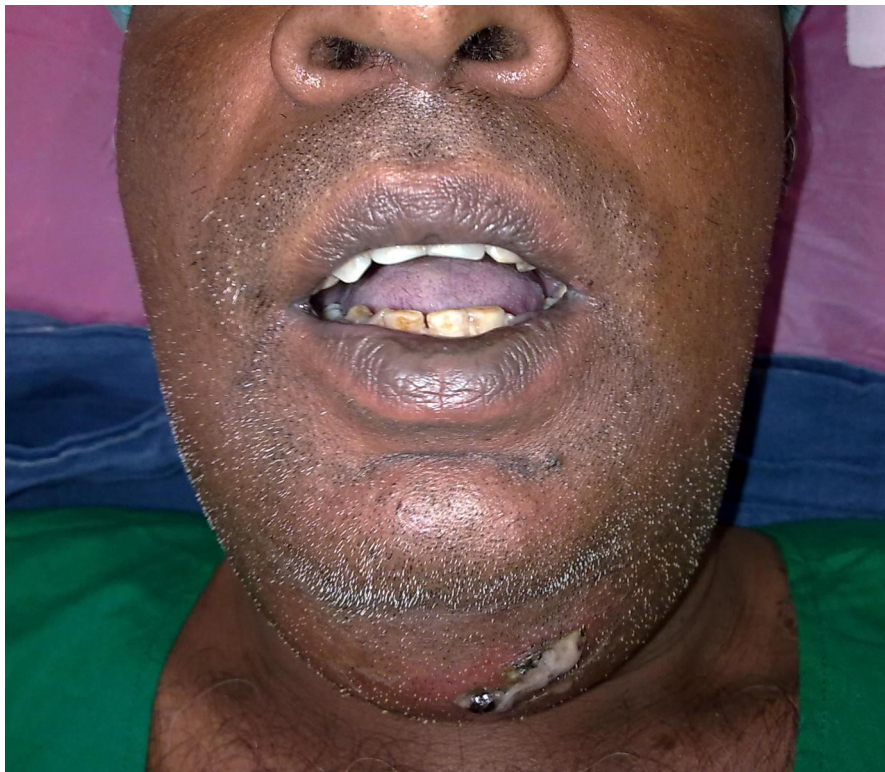


Figure 5: patient with submandibular abscess with pus pointing over



Figure 6: intra operative picture of the same patient showing abscess drained with necrotic tissue inside the cavity

Management:

A preliminary tracheostomy was done to protect the airway. Then incision and drainage of the abscess was done. The superficial and deep fascia of the sub mental and submandibular area was found to be necrosed. All the dead and necrosed tissue was removed and a thorough wound toileting was given. Culture of the pus revealed growth of bacteroides species Patient was put on parenteral antibiotics for 10 days and improved well. Tracheostomy closed after 2 weeks.

CASE 4:

18 yr old male presented with complaints of left sided neck swelling and pain of 15 days duration with history of weight loss and evening rise of temperature. He had history of left ear discharge of 20 days duration.

Clinical findings:

On examination patient was febrile. There was a diffuse swelling on left side of the neck, which was warm and tender, with shiny skin over the swelling and the lower border was not palpable. Otoscopic examination of his left ear showed two small perforations involving the anteroinferior and posteroinferior quadrants of pars tensa. USG of the neck showed left cervical lymphadenopathy. His Mantoux test was reactive with 18 mm induration.



Figure showing patient with left sided neck abscess

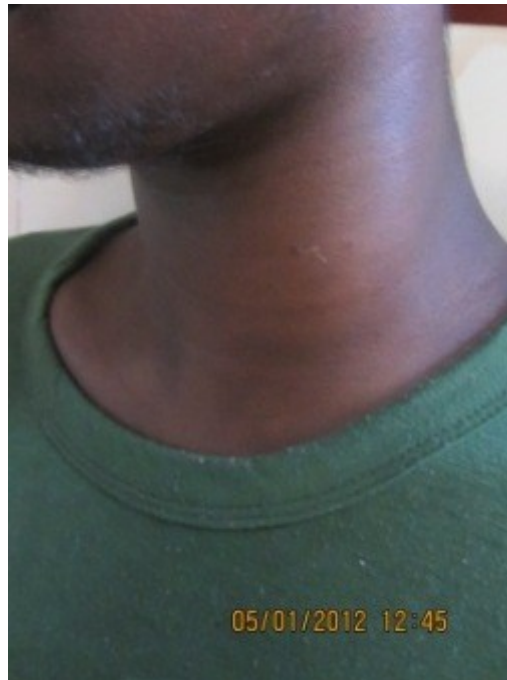
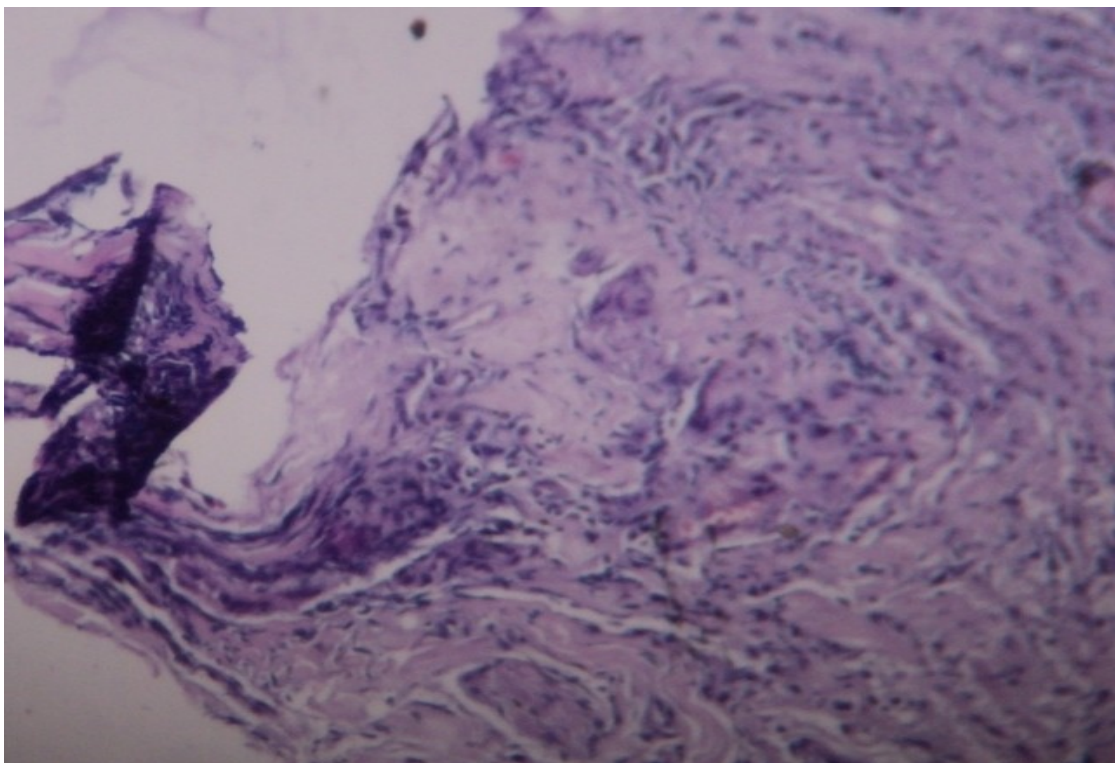


Figure showing left sided neck abscess lateral view of the same patient as shown above



Histopathological image showing granulomatous reaction

Management:

Incision and drainage of the abscess was done and the patient was put on parenteral antibiotics. Later his biopsy report came as granulomatous inflammation and he was started on category 1 anti tuberculous treatment. Patient improved well.

CASE 5:

33 yr old male presented with swelling in the right submandibular region and fever of 3 days duration.

Clinical findings:

Examination of the patient showed a swelling in the right submandibular region which was warm and tender with ill defined borders. Right upper cervical lymph node was palpable, which was mobile and tender and firm in consistency. Examination of oral cavity showed prominent Warthon's duct with pus pointing.



Figure showing patient with submandibular swelling



Intraoral picture of the same patient with enlarged submandibular salivary gland duct with discharging pus

Management:

Culture of the pus draining through the salivary duct showed growth of streptococcus viridans. Patient was treated with parenteral antibiotics with cefotaxim, metronidazole and gentamycin and supportive measures. Patient improved well and swelling subsided after 1 week antibiotic therapy.

CASE 6:

6 yr old girl presented with swelling of the submandibular region and fever of 3 days duration. The mother gives a doubtful history of fall from the school.

Clinical findings:

On examination the child appeared toxic look, drowsy and febrile with severe dehydration .There was diffuse swelling of the whole submandibular region with trismus and purulent secretion draining from the oral cavity. The swelling was warm and tender with bulging of the sub lingual space, pushing the tongue up.



Image showing submandibular swelling with shiny Skin over the swelling and purulent secretion from the mouth



Radiological image of the same patient showing undisplaced fracture of mandible

Management:

Immediate measures to improve the general condition of the patient were taken, like intravenous fluids, antipyretics and analgesics. Then an X-ray of the mandible was taken, which showed fracture of the anterior part of the mandible. Incision and drainage of the swelling was done on the next day, draining only serous fluid. Culture of the drained pus showed streptococcus viridans as the causative agent. Patient was put parenteral antibiotics with cloxacillin, metronidazole, and gentamycin. She improved well after 3 days of supportive measures and antibiotic treatment.

CASE 7:

23 yr old pregnant lady presented with swelling of the right side of neck and fever of 3 days duration.

Clinical findings:

On examination there was a swelling involving the right parotid area, which was warm and tender with trismus. There was caries teeth present in the oral cavity. USG of the neck showed cervical lymphadenopathy.



Image of patient with swelling in the right parotid region

Management:

Patient was treated with intravenous antibiotics ampicillin, gentamycin and metronidazole. Patient improved well and swelling subsided.

CASE 8:

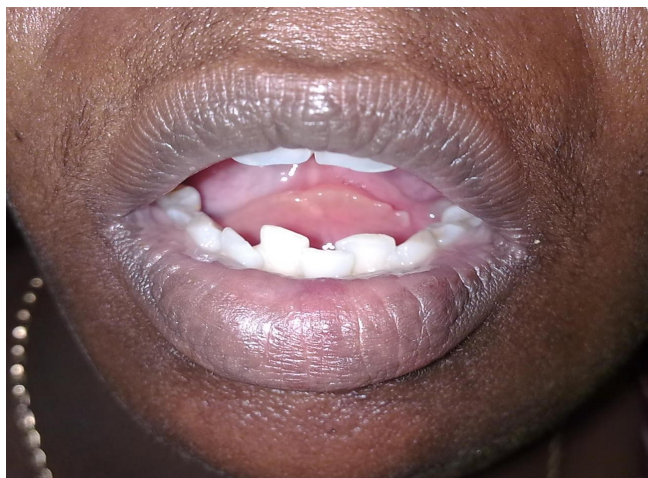
32 yr old lady presented with swelling of the left submandibular area and fever of 5 days duration.

Clinical findings:

On examination, there was a swelling involving the left submandibular area which was tender and warm. Examination of oral cavity showed trismus and prominent submandibular duct.



Figure showing patient with swelling left submanidbular area



Intraoral picture of the patient showing enlarged submandibular duct on both sides

Discussion:

CERVICAL FASCIA:

Facial planes divide the neck in to potential spaces. The two main fascial divisions of the neck are the superficial cervical fascia and deep cervical fascia. Deep cervical fascia is again divided in to an investing layer, pretracheal fascia and prevertebral fascia. The superficial fascia is just beneath the dermis and covers platysma and the muscles of facial expression.^[1]

Deep cervical fascia:

1) investing (superficial) layer: superiorly attached to the nuchal of occipital bone, over the mastoid process along the entire length of base of mandible. Inferiorly along trapezius and sternocleidomastoid, it is attached to the acromion, clavicle and manubrium sterni, fusing with their periosteum.

2) Pretracheal fascia: superiorly attached to the hyoid bone, inferiorly continues in to the superior mediastinum along the great vessels and merges with the fibrous pericardium. Laterally it merges with the investing layer of deep fascia and carotid sheath.

3) Prevertebral fascia: It covers the anterior vertebral muscles and extends laterally on scalenus anterior, scalenus medius and levator scapulae forming a fascial floor for the posterior triangle of the neck. The prevertebral fascia is particularly prominent in front of the vertebral column, where there may be two distinct layers of fascia. The space created by splitting of the anterior pre vertebral fascia, the danger space, is a part of the pre vertebral space. Superiorly it is attached to the base of skull. Inferiorly it descends in front of the longus colli in to the superior mediastinum, where it blends with the anterior longitudinal ligament. Anteriorly the prevertebral fascia is separated from the pharynx and its covering buccopharyngeal fascia by a loose areolar zone, the retropharyngeal space.^[1]

NECK SPACES:

- 1) Para pharyngeal space: Also called lateral pharyngeal or pharyngomaxillary space, it is an inverted pyramid with its superior base at the skull base and inferior apex at the junction of the posterior belly of digastric and greater cornu of hyoid bone. The pterygomandibular raphe and medial pterygoid muscle bound the space anteriorly, while the pre vertebral fascia bounds it posteriorly.^[2]
- 2) Submandibular and sublingual spaces: these two spaces functionally comprise a single space. The mucosa of the floor of mouth forms superior boundary of the submandibular space, and the digastric muscle and hyoid bone form the inferior. Anteriorly the mylohyoid muscle and anterior belly of digastric bound the submandibular space, with the posterior belly of digastric and stylomandibular ligament serving as its posterior borders. The mylohyoid muscle divides the submandibular space in to a superior sublingual compartment and inferior submaxillary compartment.
- 3) Retropharyngeal space: It extends from the skull base to mediastinum at the tracheal bifurcation and is a potential space between the middle and deep layers of deep

cervical fascia. The space lies anterior to the alar fascia and posterior to the buccopharyngeal fascia of the middle layer, which lines the posterior pharynx and esophagus.^[5]

- 4) Danger space: It is so named because of the potential for rapid inferior spread of infection to the posterior mediastinum through its loose areolar tissue, extends from skull base to the diaphragm. This potential space lies between the retropharyngeal and pre vertebral spaces. The alar layer forms its anterior border; the pre vertebral layer forms its posterior border. Laterally transverse processes of vertebrae enclose the danger space.
- 5) Masticator space: The superficial layers of deep cervical fascia define this space upon splitting at the inferior border of mandible to cover the medial pterygoid and masseter muscle. The fascia continues superiorly to cover the inferior tendon of temporalis muscle and incorporate with the superficial temporalis fascia. It contains the mandible and muscles of mastication, third portion of trigeminal nerve, internal maxillary artery and much of the buccal pad of fat.
- 6) Peritonsillar space: It consists of loose connective tissue between the capsule of the palatine tonsil and superior constrictor muscle. The anterior and posterior tonsillar pillars contribute its anterior and posterior borders respectively.
- 7) Pre vertebral space: this space is enclosed by the pre vertebral fascia, vertebral bodies and transverse processes and extends from the clivus of the skull base to the coccyx. It is a compact potential space that contains dense areolar tissue and lies posterior to danger space.
- 8) Parotid space: The superficial layer of deep cervical fascia forms the parotid space as it splits to enclose the parotid gland. However the fascia which does not enclose the superomedial aspect of the gland permits communication with the pre styloid compartment of parapharyngeal space.
- 9) Carotid space: The carotid or the visceral vascular space is the potential space within the carotid sheath containing the carotid artery, internal jugular vein, vagus nerve and sympathetic plexus.
- 10) Anterior visceral space: The visceral division of the middle layer of deep cervical fascia encloses the anterior visceral space or the pretracheal space, which lies immediately anterior to the trachea. It extends from the thyroid cartilage to the superior mediastinum. It contains the pharynx, larynx, trachea, esophagus and thyroid gland.

SUMMARY

No.	Neck space involved	Etiology	Microbiology	Preliminary tracheostomy	Treatment
CASE 1	Submandibular & parotid	odontogenic	Mixed flora	+	I & D, I.V antibiotics
CASE 2	pretracheal	tuberculosis	mycobacterium	–	ATT
CASE 3	submandibular	odontogenic	Bacteroides sp.	+	I & D, I.V antibiotics
CASE 4	pretracheal	tuberculosis	mycobacterium	–	ATT
CASE 5	submandibular	odontogenic	Strept.viridans	–	I.V antibiotics
CASE 6	submandibular	fracture mandible	Strept.viridans	–	I & D, I.V antibiotics
CASE 7	parotid	–	–	–	I.V antibiotics
CASE 8	submandibular	–	–	–	I.V antibiotics

Table showing the summary of cases studied. I.V =intravenous, I&D = incision and drainage, ATT=antituberculous treatment.

CONCLUSION

All the cases of neck space infection presented had swelling of the neck and fever of short duration as the universal symptom. All patients with involvement of submandibular region had trismus, while those with involvement of lower neck had torticollis. Patients were put on an almost universal regime of parenteral antibiotics i.e. cefotaxim (to cover gram positive organisms), gentamycin (to cover gram negative organisms) and metronidazole (against anaerobic organisms), which showed a dramatic response within 3 days .Out of the 8 cases presented 2 cases were of tuberculous infection and was started on anti tuberculous treatment. Among these 5 cases treated with incision and drainage of the swelling of which 2 cases needed preliminary tracheostomy to protect the airway. These 2 cases of temporary tracheostomy were closed after 10 days.

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