



Management of Benign Neck Swellings involving Different Compartments – Case Series

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ABSTRACT

Introduction

Neck has a complex anatomy with important neurovascular structures and divided into several compartments. Swellings of different etiology and pathogenesis occur in the neck giving rise to varied signs and symptoms. Surgical management of such swellings may be difficult as their location may be related to important neurovascular structures of neck giving rise to complications if any inadvertent injury happens during surgery. The main objective of this study is to enlighten the difficulties and complications we faced in managing a series of 4 cases with different neck swellings in different compartments.

Case Series

In this article, we present 4 different cases of neck swellings – cystic hygroma, huge autoimmune thyroid swelling, deep part of submandibular gland sialolithiasis and submental arteriovenous malformations having different etiology arising in different compartments related to different structures with their management.

Conclusion

To manage a case of neck swelling proper history, examination, appropriate investigations and thorough anatomical knowledge of site, fine surgical skills with experience may be required to prevent complications and to perform successful surgery.

Keywords

Cystic Hygroma; Arteriovenous Malformations, Submandibular Gland Sialolithiasis, Graves Disease

Neck anatomy is very complicated as numerous important vascular and neural structures with variable course and depth traverse through it. The neck is divided into several compartments and subdivisions for easy understanding. Anterior and posterior triangles are the main subdivisions. Anterior triangle is divided again into sub mental, submandibular in superior division and muscular and carotid triangles in inferior division.¹ Each triangle is composed of muscles, nerves, vasculature, lymphatic's, and adipose tissue. Different types of swellings with different aetiology, pathogenesis and different presentation occur in the neck. Neck swellings may be benign or malignant. The most

common benign neck swellings are thyroid swellings, salivary gland swellings and cervical lymphadenopathy. Thyroglossal cysts, branchial cleft cyst and lymphatic malformation etc., are less common pathologies presenting as neck swellings.² Once a case of neck swelling comes detailed history and examination, investigations like ultrasound [USG], Computerised Tomography [CT] scans, Fine needle aspiration cytology [FNAC] to be done. A good clinical, radiological, and cytological correlation is necessary to plan surgical intervention.³ Here with we are reporting a series of 4 cases with benign neck swellings with different aetiologies', different presentation confining to different divisions of neck with their management.

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Case Series

Case 1:

A 30 year old female patient came with swelling over

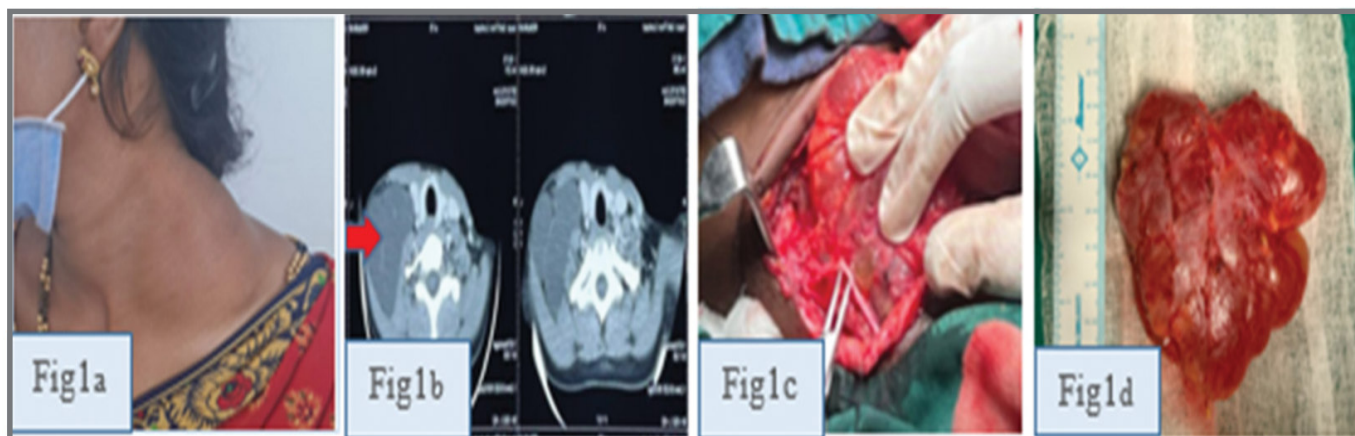


Fig. 1. 1a: Clinical image of patient showing extension of the swelling; 1b: CECT scan showing the lesion; 1c: Instrument pointing at Spinal accessory nerve; 1d: Multiloculated cystic mass after excision.

left lateral side of neck since 2 years, gradually increased in size, not associated with any pain, discharge, trauma or surgery history and difficulty in neck movements. On examination, a lobulated oval swelling of size 10cm × 8cm was noted extending from hyoid superiorly to clavicle inferiorly and from medial border of left sternocleidomastoid medially to medial border of trapezius laterally (Figure 1a). USG, FNAC and CECT neck (Figure 1b) were suggestive of cystic hygroma. CECT showed the cystic mass was pushing left internal jugular vein (IJV) medially and was just adjacent to it.

Surgical excision was planned keeping in mind the chances of encountering IJV bleed and spinal accessory nerve damage. A linear incision extending from anterior border of left sternocleidomastoid to anterior border of left trapezius muscle was taken. Sub-platysmal flaps were elevated and external jugular vein was noted over the lesion and was separated from it. The lesion was separated initially from IJV anteromedially with the help of cottonoid dissection under sternocleidomastoid, not using any sharp instruments and then the surrounding structures. Laterally in the base of swelling spinal accessory nerve was identified slightly adhered to swelling in its floor and was preserved (Figure 1c). Huge multiloculated cystic mass was excised (Figure 1d) and on examination of floor of the cyst it had sternocleidomastoid anteriorly, posteriorly trapezius muscle was noted with spinal accessory nerve traversing between

and middle part of inferior belly of omohyoid was noted near to inferior portion of dissection site. As the swelling was in superficial plane superficial to the prevertebral fascia phrenic nerve, subclavian vessels and brachial plexus were not visualized. later the surgical site was closed in layers with drain in-situ. Histopathology confirmed the lesion as cystic lymphangioma. Postoperative period was uneventful and the drain was removed after 3 days. On follow-up after 6 months, patient is doing fine with no signs of recurrence.

Case 2:

A 28 year old female patient came with chief complaints of huge neck swelling on anterior aspect of neck (Figure 2a) since 10 years with associated symptoms of heat intolerance, profuse sweating, weight loss, irritability. Patient also had complaints of gradual change in voice due to pressure effects on anterior neck since 6 years, difficulty in breathing and swallowing since 1 year. Patient was a known case of hyperthyroidism and was on Tab Neomercazole 20 mg twice a day since 13 years.

On examination, a diffuse thyroid swelling over anterior aspect of neck with right lobe measuring 8 × 5 cms and left lobe measuring 7 × 5cms was noted (Figure 2a). The mass was extending from hyoid bone superiorly, suprasternal notch inferiorly and laterally till medial border of sternocleidomastoid muscles on both sides. Lower



Fig. 2: 2a: Extension of anterior neck swelling; 2b: CECT neck showing nodular lesion in left thyroid lobe ; 2c: Total thyroidectomy specimen showing left lobe with isthmus and right lobe separately

border of the swelling was palpable. USG neck reported as both lobes of thyroid and isthmus are enlarged with increased echotexture and internal vascularity with TIRADS 4 nodule in left lobe. FNAC showed features of Hashimoto's thyroiditis. CECT neck reported as thyroid gland is diffusely enlarged in size measuring 3 x 2.6 x 8 cms on right side and 3.9 x 3.4 x 7cms on left side with heterogeneous enhancing nodular lesion in left thyroid lobe with extension to isthmus (Figure 2b). Lab investigations revealed T4-3.56, T3-1.05 which are in normal range and TSH- 5.99 which is slightly on higher side, Anti TPO antibodies – 49 IU/ml. Rest of the investigations were within normal limits. Nuclear scanning was not done as patient is not affordable and as no signs of hyperthyroidism were noted clinically and in biochemical investigations .

Pre-operative preparation of the patient involved an expert opinion from Endocrinologist in view of thyroid hormone imbalance for which no comment on preoperative beta blockers was given as the patient thyroid levels were in hypothyroid state at time of plan of surgery and she didn't show any clinical features of hyperthyroidism. Informed consent was taken anticipating intra and post-operative complications. Initially, a horizontal incision of size 8 cms was given over the neck 2 cms above the suprasternal notch, subplatysmal flaps elevated, left hemi-thyroidectomy was done after tracing left recurrent laryngeal nerve which is noted posterior to inferior thyroid artery, followed by completion thyroidectomy was done after retention of parathyroid

glands (Figure 2c). Total thyroidectomy was done as the right side gland was also enlarged with radiological features of thyroiditis and risk of malignant transformation in later phase was suspected. Hyper vascular gland was noted intra-operatively with profuse bleeding on handling which is feature of graves disease. In view of profuse bleed, huge size gland involving 2lobes with peripheral adhesions total thyroidectomy had been done rather than hemi or subtotal thyroidectomy and we couldn't trace superior laryngeal nerves on both sides due to huge gland size and intraop bleeding. Histopathological examination was reported as Hashimoto's thyroiditis with Graves disease. Immediate post-operative bilateral vocal cord palsy was noted with intermediate position of both vocal cords leading to breathy voice and risk of aspiration. With steroids, speech therapy and conservative management, complete adduction movements of both vocal cords were regained after 1 month with restricted abduction on right side.

Case 3:

A 51 year old male patient came to ENT OPD with complaints of swelling in right submandibular region since 3 years which is gradually increasing in size, not associated with pain. On examination, an oval swelling of 3 x 2 cm firm to hard in consistency, non-tender, non-mobile, bimanually palpable noted in right submandibular region. CECT Neck showed calculus measuring 2.1 x 1.4 cm in deep lobe of right submandibular gland, 8 x 5 mm calculus in superficial lobe. FNAC

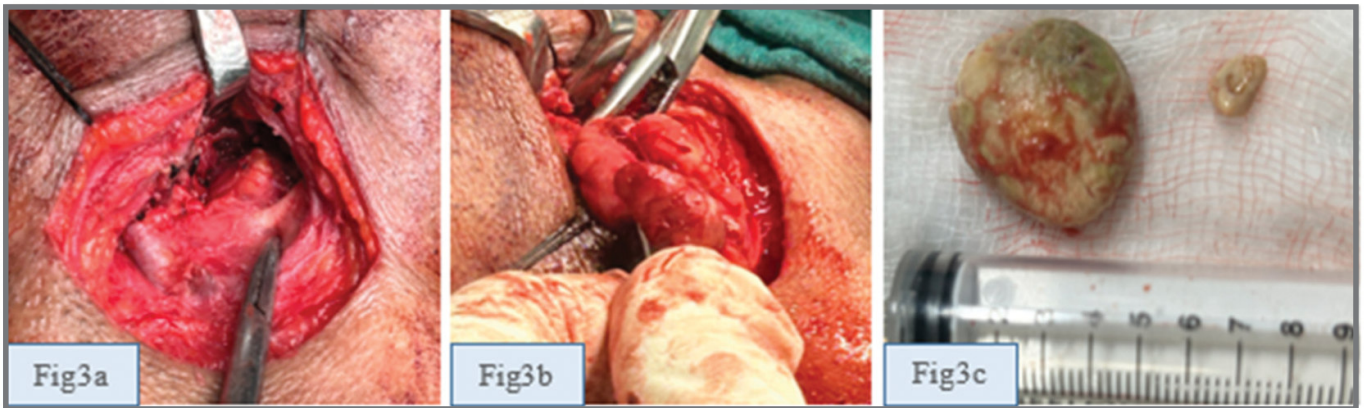


Fig. 3: 3a: Instrument pointing at Lingual nerve 3b: Image showing Right submandibular gland; 3c: Image of calculi after excision

suggestive of sialadenitis. Due to large size of calculi and its site within deep lobe, patient opted for total gland excision rather than retrieval with sialendoscopy after knowing the chances of duct and gland fibrosis and incomplete removal with need of revision surgery with sialendoscopy are high. After preserving the neural structures (Figure 3a), right submandibular gland excision (Figure 3b) with calculi (Figure 3c) was done with intra and postoperative periods uneventful. The marginal mandibular nerve, lingual and hypoglossal nerves are spared with proper ligation of duct.

Case 4:

A 23 year old female patient came with complaints of swelling below the chin since 1 year, gradually increased in size without pain, discharge and no oral discomfort.

On examination 4 × 3 cms oval swelling was noted in sub mental region (Figure 4a), not mobile, non-tender, soft, fluctuant and not reducible. Skin pinchability was present with visible pulsations over swelling. USG and CECT (Figure 4b) showed tuft of vessels with vascular malformation mostly AV malformation with vascular supply from bilateral external carotid artery branches and venous drainage into bilateral internal jugular veins. Surgical excision was planned for cosmetic reasons and also to prevent chances of haemorrhage from malformation in future if left untreated. Once subplatysmal flaps were raised mass of vascular tissue noted under and between bilateral anterior belly of digastric muscle (Figure 4c). Feeding vessels clamped and ligated and tuft of vascular tissue removed in total (Figure 4d). As no much important neurovascular structures were noted near submental region the surgery

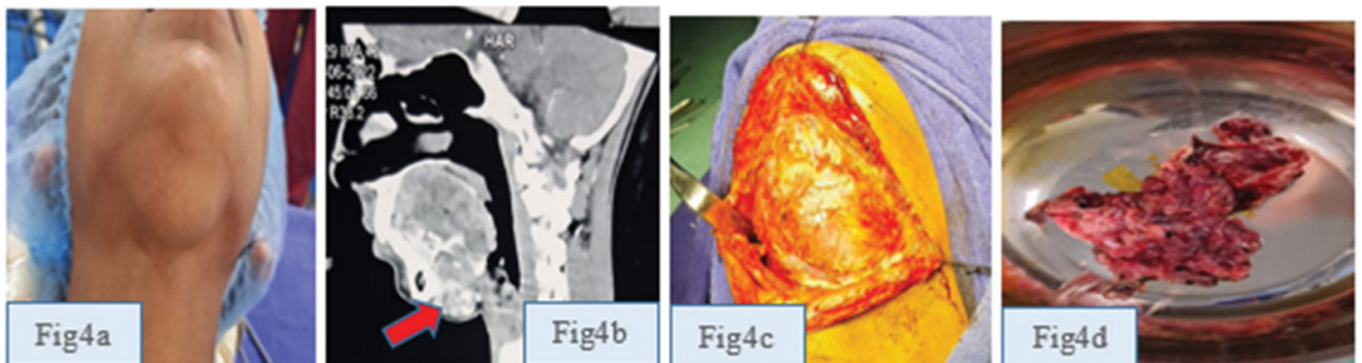


Fig. 4: 4a: Extension of swelling in sub-mental region; 4b: CECT showed tuft of vessels with vascular malformation; 4c: Mass of vascular tissue between bilateral anterior belly of digastric muscle; Figure 4d: Specimen after total excision

was done uneventfully once the feeding vessels got ligated. Histopathological examination showed arterio-venous malformation. 1 year follow-up, no recurrence noted.

Discussion

Swellings in the neck can originate from different structures and can involve different compartments. Here in this series of 4 cases we have seen benign swellings of different origin and aetiology arising from different compartments of neck. A thorough history, examination with couple of investigations were the crucial things for management of neck swellings without complications.

In case 1- Cystic hygroma, the swelling was present in posterolateral part of neck corresponding to posterior triangle. It is a benign congenital malformation of lymphatic tissue usually occurs before 2nd decade of life and rare in adults.⁴ Conservative observation, surgery, sclerotherapy, and medical management are different modes of treatment of which surgical excision and sclerotherapy gives better responses.⁵ As the patient presented with swelling in this region, after a thorough history and meticulous evaluation, patient was posted for surgery. As the lesion is noted in posterior triangle, need to be careful with important structures like accessory nerve (CN XI), the trunks of the brachial plexus, third part of the subclavian artery etc. We have encountered the spinal accessory nerve during surgery almost adherent to lesion, so dissected carefully and could retain it. Intra and postoperatively the patient did not have any complications.

The 2nd case was huge thyroid swelling with autoimmune thyroiditis. The swelling was noted in central compartment of anterior triangle of neck corresponding to muscular triangle. It was a diffuse swelling with compressive symptoms for patient. With the history suggestive of a swelling with hyperthyroidism initially which reverted to hypothyroidism with drug therapy, the patient was planned for total thyroidectomy after necessary investigations. As the swelling was in muscular triangle of anterior neck the important structures to be secured were recurrent laryngeal nerves [RLN], parathyroid glands etc. Even though careful dissection was done with identification of both RLN and parathyroids the patient had bilateral vocal cord palsy in the

immediate postoperative period which recovered with steroids and speech therapy in a month. The RLN is very sensitive and can be harmed by different intraoperative manipulations (i.e., cutting, clamping, stretching, compressing, and heating etc.).⁶ The cause of palsy in our case might be due to compression and ischemia. Postoperative calcium and Parathormone levels were normal. Other complications like temporary dysphonia occurs in 5-11% of cases and may be permanent in 1 to 3.5% of cases, and temporary hypoparathyroidism occurs in 20 to 30% of cases and may be permanent in 1 to 4% of cases.⁷

The 3rd case discussed was submandibular gland sialolithiasis. Patient had swelling in right submandibular region in anterior neck. As the stone was of size 2cm within deep part of gland and also another small calculi in superficial part, we have planned for total gland excision after discussing with the patient regarding the pros and cons of conservative endoscopic and intra oral manoeuvres. If the stone is deeply seated within the gland, if severely damaged tissue is present, or if recurrent stone formation is a concern, the surgeon can opt to remove the entire affected salivary gland.^{8,9,10} The important structures pertaining to this submandibular or digastric triangle are facial artery and vein, lingual nerve, hypoglossal nerve, marginal mandibular nerve. A horizontal incision was made 2 fingerbreadths below the mandible with flap elevation along posterior facial vein was done to retain marginal mandibular nerve. Gland excised intoto after visualising and retaining lingual nerve, hypoglossal nerve and ligating the submandibular duct. Intra and postoperative periods were uneventful. Temporary marginal mandibular nerve (MMN) damage after transcervical submandibular gland surgeries is reported as 36%¹¹ and the permanent damage as high a rate as 12%¹² in the literature. Among the surgical complications, hypoglossal nerve damage has been reported very rarely (0–1.4%).¹³

The 4th case was submental vascular malformation. Patient came with complaints of swelling in the submental region of anterior triangle of neck. Arteriovenous malformations (AVMs) are vascular malformations that present high-flow direct communication between the arteries and veins, not involving the capillary beds. AVMs represent only 1.5% of all vascular anomalies^{14, 15} and

are often identified in the Head and neck region (47.4%) and in the extremities (28.5%).¹⁶ Surgical resection, transcatheter embolization, direct percutaneous embolization/sclerotherapy, laser coagulation, and drugs are usual modes of treatment depending on size and site. We have done surgical excision of tuft of vessels once the feeding vessels were ligated. There are not much important structures in sub mental region so the dissection was done comfortably with only controlling the bleeding. Even though we haven't faced any post op complications, usual Postoperative complications that can be anticipated in this region are submental depression, submental edema, hypertrophic scar formation, scar contracture, cervical necrotizing fasciitis etc

Thus in this series of cases we have encountered swellings in different subdivisions of neck having different important neurovascular structures. With proper evaluation and fine surgical procedures all the cases were properly handled without any permanent postoperative complications.

Conclusion

Herewith we can understand that neck anatomy is very complex. Hence we conclude that proper overall anatomical knowledge, complete analysis of swelling with history, examination and necessary investigations and preoperative planning of surgical steps, fine skilled surgical techniques are utmost important things required to manage a case of neck swelling without severe permanent complications. We could have got complete orientation of neck if more number of neck swelling cases involving all the compartments of neck have been covered which was the limitation of this series.

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