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Approach To Upper Cervical Spine Through Anterior Neck: Technique And Outcome

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ABSTRACT:
Approach to the upper cervical spine is challenging due to its location and proximity to vital structures. Various approaches have been described in the literature each with their own merits and demerits.Through this case report, we describe the anterior neck approach to the upper cervical spine, in a patient with quadriparesis due to cord compression caused by pathology involving C2-C3 vertebrae.Nuances of this approach are described tooptimizeexposure and improve outcome.

KEYWORDS: Anterior retropharyngeal approach, Upper cervical spine, Anterior neck approach

I. INTRODUCTION

Surgical exposure of the upper cervical spine poses a challenge to the operating surgeon due to its location behind the mandible amidst vital structures overlying the area.[1,2,3]Various approaches for access to the upper cervical spinehave been described in literature, each with their merits and demerits. The transoralas well as the posterior approaches are conventionally utilized to approach this area depending on specific indications.The transoral approach is however fraught with high rates of salivary contamination, hemorrhage, infection and respiratory complications.[2,4,5] Amongst the other approaches, the anterior retropharyngeal approach, also known as submandibular approach carries the risk of injury to hypoglossal nerve, superior laryngeal nerve, marginal mandibular branch of facial nerve, submandibular gland, transient hoarseness and dysphagia following surgical dissection and tissue handling between the carotid sheath laterally and pharyngeal constrictor muscles medially. This approach however provides adequate working space to the C2-C3 vertebra if performed appropriately.[1,3,5,6]

The authors describe the submandibular approach in detail through a case report to help achieve optimal surgical exposure and minimal postoperative morbidity.

II. CASE REPORT

50 years old female with history of progressive weakness in limbs of 6 months duration was diagnosed with C2-C3 mobile listhesis causing compressive myelopathy. She was planned for discectomy with anterior fusion surgery via the anterior retropharyngeal approach.

III. TECHNIQUE

The patient was placed in a supine position with the head rotated 30° to the contralateral side with slight neck extension. A horizontalincision was placed 2 cm inferior to the lower border of the left side of the mandible, extending from midline to the anterior border of the sternocleidomastoid muscle. The superficial cervical fascia and platysma muscle were divided transversely. Blunt dissection of the subplatysmal plane was performed to achieve adequate exposure.(Fig. 1)

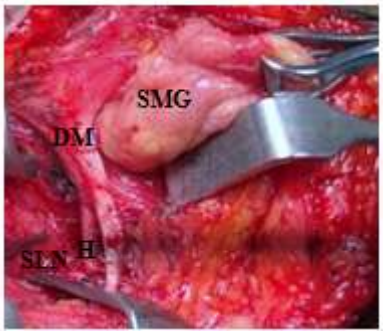

Fig.1.Exposure after submandibular glandretraction (SMG: Submandibular gland, DM: Digastric muscle, H: Hypoglossal Nerve, SLN: Superior laryngeal nerve)

The submandibular gland was exposed, dissected and elevated superolaterally. The facial artery was identified at the level of the digastric

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muscle and retracted superolaterally towards the mandible. The intermediate tendon of digastric muscle was incised to mobilise and retract it superiorly along with the stylohyoid muscle. (Fig. 2)

Fig.2. Exposure after severing the tendon of digastric muscle and rotation of laryngeal framework (DM: Digastric Muscle, PP: Pharyngeal Plexus)

This facilitated medial retraction of the hyoid bone. The hypoglossal nerve was exposed. Dissection of the fascial plane between the sternocleidomastoid muscle and carotid sheath laterally and the trachea, hypopharynx,and oesophagus medially was carried out, leading to adequate exposure of the retropharyngeal space and the prevertebral fascia around the longuscolli muscles. Care was taken to identify and preserve the superior laryngeal nerve and the pharyngeal plexus of nerves. The retropharyngeal areolar tissue and the prevertebral fascia were incised exposing the anterior surface of atlas and the C2 and C3 vertebrae.

Fig.3.C arm image with arrow pointing to C2-C3 vertebrae

Exposure was adequate to perform discectomy at C2-C3 level with reduction of listhesis. Anterior fusion with zero-p cage (Metronic Company) and autologous iliac crest grafting was done followed by fixation of cage with one screw each in C2-C3 vertebrae. (Fig.4)

Fig.4. Immediate post operative radiograph

IV. POST OPERATIVE PERIOD

Post operative immobilization was done using Philadelphia cervical collar. The patient was started on oral feeds from 3rd postoperative day. There was no aspiration and tongue movements were normal. There was mild dysphagia which was not functionally morbid.

V. DISCUSSION

The anterior approach was chosen over the conventional posterior approach since the patient had a congenital anomaly leading to the absence of posterior element of C2. Approaching posteriorly would have increased the surgical morbidity due to need for sacrifice of additional joints (C1 as well as C3).Furthermore, an abnormal intracanal loop of vertebral artery inside C2-C3 vertebrae made the anterior approach the preferred approach for this patient.[4,7,8]

One of the prerequisites for the anterior approach is presence of long, lean necks. However, adequate extension and neck rotation ensured that despite a short neck our exposure was adequate. [8,9]

While the anterior approach provides adequate working space, it has been associated with injury to the hypoglossal and mandibular branch of facial nerve,respiratory dysfunction, pharyngeal fistula, salivary fistula,transient hoarseness and dysphagia,as well as dural leakage.[2,5,8,10]During meticulous dissection, the marginal mandibular nerve, the hypoglossal nerve and to a large extent the superior laryngeal nerve are at a plane superficial to the area of interest.

Once the digastric tendon is severed to improve exposure, deeper dissection leads to handling of the pharyngeal plexus of nerves which are at a greater risk of paresis probably explaining the post operative dysphagia. Careful handling of the nerve plexus supplying the constrictor muscles cannot be underestimated.Also meticulous understanding of the surgical anatomy of this region is essential to avoid debilitating morbidity as mentioned above.[2,7,11,12]

VI. CONCLUSION

The anterior retropharyngeal approach is a safe procedure which provides direct access to the upper cervical spine if performed with meticulous handling of tissues and detailed understanding of surgical anatomy.

REFERENCES

[1]. Park SH, Sung JK, Lee SH, et al. High anterior cervical approach to the upper cervical spine. SurgNeurol 2007;68:519–24.
[2]. Finn MA, Macdonald J. C2–3 anterior cervical fusion: Technical report. J Spinal Disord Tech 2016 Dec;29(10):536-41.
[3]. Russo A, Albanese E, Quiroga M, and Ulm AJ. Submandibular approach to the C2–3 disc level: microsurgical anatomy with clinical application. J Neurosurg Spine 2009;10:380–9.
[4]. LausM, et al. Anterior extraoral surgery to the upper cervical spine. Spine 1996;21:1687-93.
[5]. Haller JM, Iwanik M, and Shen FH. Clinically Relevant Anatomy of High Anterior Cervical Approach. Spine 2011;36:2116–21.
[6]. Visocchi M, Signorelli F, Parrilla C, et al. Multidisciplinary approach to the craniovertebral junction. Historical insights, current and future perspectives in the neurosurgical and otorhinolaryngological alliance. ActaOtorhinolaryngolItal 2021;41(SUPPL.1):S51-8.
[7]. Martin-Ferrer S. High cervical spine injuries: classification, therapeutic indications, and surgical approaches: 286 consecutive cases. Neurocirugia2006;17:391–419.
[8]. S.A. Fard et al. Anterior upper cervical spine approach. J ClinNeurosci 2015 Nov;22(11):1810-5.
[9]. Behari S, Banerji D, Trivedi P, Jain V K, Chhabra D K. Anterior retropharyngeal approach to the cervical spine. Neurol India 2001;49:342-9.
[10]. Banga et al.Atlantoaxial Dislocation: Surgical Outcome followingAnterior Retropharyngeal Approach to Odontoid with or without Fixation. Indian J Neurosurg 2022;11:13–8.
[11]. Fang HS, Ong GB. Direct anterior approach to the upper cervical spine. J Bone Joint Surg Am 1962; 44:1588–604.
[12]. Gutierrez S et al. The pharyngeal plexus: an anatomical review for better understanding postoperative dysphagia.Neurosurg Rev 2021;44(2):1-10.