ORIGINAL ARTICLE

Subcutaneous Endoscopic Surgery in the Head and Neck Region – Single Port, Non Insufflatory Approach

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ABSTRACT

Introduction: Patients undergoing plastic surgery in the Head and Neck region for subcutaneous lumps, blood vessel dilatation or muscle reduction request a scar-free procedure. Cavitary endoscopy for examination and surgery has been popular since the late 1980s. Subsurface endoscopy is not as common except for facial aesthetic procedures. The authors describe a single-port approach without the need for carbon dioxide insufflation or ballooning.

Aim: To demonstrate the efficacy and safety of subsurface endoscopic procedures in the head and neck region.

Methods: 29 patients with head and neck swellings or deformities were treated by the sub-surface endoscopic, single port approach without carbon dioxide insufflation from Aug 2019 to date. Incisions were placed within the hairline or were placed in concealed locations. A 30-degree-viewing 4mm endoscope (Karl Storz), its cold light source, and a 3-chip camera with a fenestrated guard were used, along with suitable retractors and other instruments. Conversion to open surgery if required, operating time, postoperative pain, complications if any and patient satisfaction rates on a VAS scale from 1- 10 were noted.

Results: All 29 patients underwent subsurface endoscopic surgery successfully, with high patient satisfaction rates. Postoperative pain was less than 4/10 with minimal analgesic needs. There was minimal bleeding at the operative site. Only one patient had transient palsy of the frontal branch of the facial nerve which recovered completely.

Conclusion: Subsurface endoscopic surgery in the head and neck region is safe, with excellent results.

Clinical Significance: The option of subsurface endoscopic surgery outweighs open surgery in the head and neck region by avoiding visible unsightly scars.

Keywords: endoscopic surgery, subsurface, scar-free, head and neck.

JMS: 2024; 27(4):23-28 DOI: https://doi.org/10.33883/jms.v27i4.1414

INTRODUCTION

Head and neck surgery using endoscopy has become popular despite the initial learning curve[1]. However, subsurface endoscopy in plastic surgery has increasingly turned towards aesthetic procedures[2]. There are many areas of interest in the head and neck region for the reconstructive plastic surgeon to employ endoscopic techniques. In subsurface endoscopy, the magnification of subcutaneous structures facilitates visible dissection and manipulation leading to better performance. The visible areas of the head and neck especially lend themselves to subsurface endoscopy, avoiding visible scars. A wide variety of endoscopic and endoscopy-aided procedures are described.

MATERIALS AND METHODS

Patients with subcutaneous lumps of the face, masseter hypertrophy, vascular malformation, branchial sinus and congenital muscular torticollis underwent endoscopic surgery. Patients and families in the case of minors were counselled regarding the options of endoscopy or open procedure and the possibility of converting to open surgery. Detailed consent for the procedure, photography and video-imaging of the endoscopy procedure was obtained. All age and gender groups were included.

Endoscopy strip craniectomy was excluded from the series. Any neighboring facial pustular acne or skin infection was a contraindication for surgery. A 4mm, 30-degree viewing endoscope with sheath (Karl Storz, Germany) and standard

Access this article online

Website: www.jmsskims.org

DOI: https://doi.org/10.33883/jms.v27i4.1414

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How to cite this article: Swain B, Shalini A, Gorle S. Subcutaneous Endoscopic Surgery In The Head And Neck Region – Single Port, Non Insufflatory Approach. JMS 2024: 27 (4)23-28

Received: 2024-12-10 Accepted: 2025-01-02

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instrumentation including periosteal elevators, dissecting scissors, nerve hooks, retractors and other instruments were used.

A single port of size 1-4 cm was used, the incision being placed in the hairline, intra-oral, conjunctival and axilla. Most of the cases were done by a single surgeon using the left hand for manoeuvring the endoscope and the right hand for grasping and navigating the instruments or electrocautery. The single-port approach facilitates independent endoscopic viewing and instrumentation simultaneously.

Carbon dioxide insufflation or balloon dilatation was not used in any of the cases.

Operating time and visual analogue scores for pain within 24 hrs following surgery and satisfaction levels of none (0) / low (1-4) / moderate (5-8) and high (9-10) at the last review, on a visual analogue scale of 1-10 were noted. The patients had been followed up for a period ranging from 6 weeks to 4 years.

RESULTS

29 endoscopic procedures were conducted on 29 patients with subsurface endoscopy from August 2019 to date For the face, 14 cases of upper third, 4 cases of middle third and 3 cases of lower third, with 8 neck procedures were done endoscopically. In total, 29 cases were done in the Head and Neck region.

Case 1: A 14-year-old girl presented with drooling saliva from the left cheek, especially on eating causing much social embarrassment. It was diagnosed on MRI with contrast as an anomalous parotid duct opening. It was reconstructed by rerouting the duct intra-orally under endoscopic vision to an area of the left buccal mucosa corresponding to its normal position- by the modified Delores method. She had a successful diversion of the salivary stream. (Fig-1). The external incision was closed in a purse-string manner, minimizing the visible scar.

Case 2: A 17-year-old boy presented with a firm subcutaneous swelling of the left cheek; previous fine needle aspiration results were inconclusive. Under general anesthesia, two incisions were made in the left alar groove and a zig-zag mucosal incision on the left upper lip; through both approaches, subcutaneous dissection was done. Under endoscopic vision the mass was dissected out and removed completely. Histopathological findings were consistent with fibrous dysplasia (Fig- 2)

Case 3: A 12-year-old girl presented with an inability to bend her neck to the right side since birth. A zig-zag 4cm incision was placed in the anterior axilla and dissection was done in the subcutaneous plane leading to the restraining fibrotic lower sternal and clavicular heads of the sternocleidomastoid muscle. The bands were dissected with right-angled forceps and divided by electrocautery. Intraoperative neck movements confirmed complete release. Post-operative physiotherapy could be commenced after 24 hours. (Fig-3)

Case 4: A 13-year-old girl had a discharge of mucus through a small opening on the right lower neck. On probing under anesthesia, a long tract could be made out. An elliptical incision was made circumscribing the opening. Under endoscopic vision, the tract could be easily visualized and dissected to its end and excised completely. The resultant scar was relatively small and less conspicuous. (Fig-4)

Soft tissue and bony lumps were excised from the forehead, fractures reduced and bone grafts placed, deep-seated vascular malformations were excised and trans-axillary release of restricting bands was done in congenital torticollis with the subsurface endoscopic approach.

All endoscopic surgical procedures were successful and there were no conversions to open surgery. The pain scores were consistently below 4/10 and the patient satisfaction score was 9-10 (high) in all cases. (Table 1)

DISCUSSION

Cold light due to fibreoptic technology and the miniature chip camera connected to a monitor were responsible for the development of endoscopy[3].

The use of endoscopic surgery for head and neck reconstructive surgery was reported by the University of Alabama in the early 1990s when they performed endoscopic facelifts[2]. This was soon followed by subsurface procedures for the removal of cysts and other lumps. The subsurface division of the sternocleidomastoid for congenital muscular torticollis was reported by Burstein[4] by a mastoid approach. The trans-axillary approach was then described by Swain[5] and subsequently adopted by Dutta[6] in children using insufflation to create a tunnel. Endoscopy is being increasingly used for excision of subsurface tumours

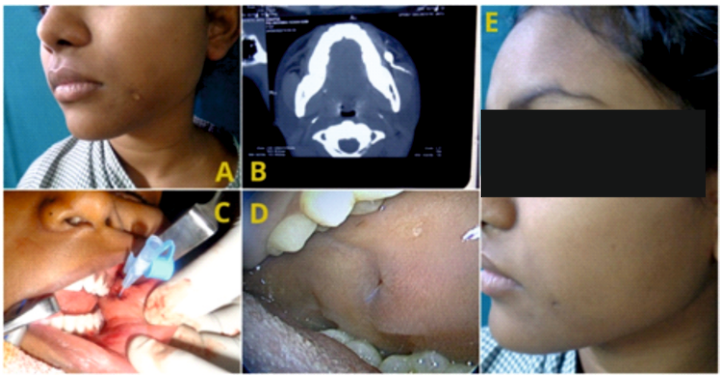


Fig. 1: A: Visible drooling of saliva from opening onto left cheek, B: CT contrast showing duct opening onto skin. C: cannulated duct orifice after transposition; D: discharge of saliva from transposition; E: Resultant scar



Fig. 2: A: swelling left cheek; B: endoscopic view of subcutaneous lump; C: excised specimen; D: post-operative view of left cheek



Fig. 3: A: congenital muscular torticollis left side; B: endoscopic delineation of tight clavicular head of sternocleidomastoid muscle; C: after near total division of the restraining band by electrocautery; D post-operative view with scar hidden behind anterior axillary fold.

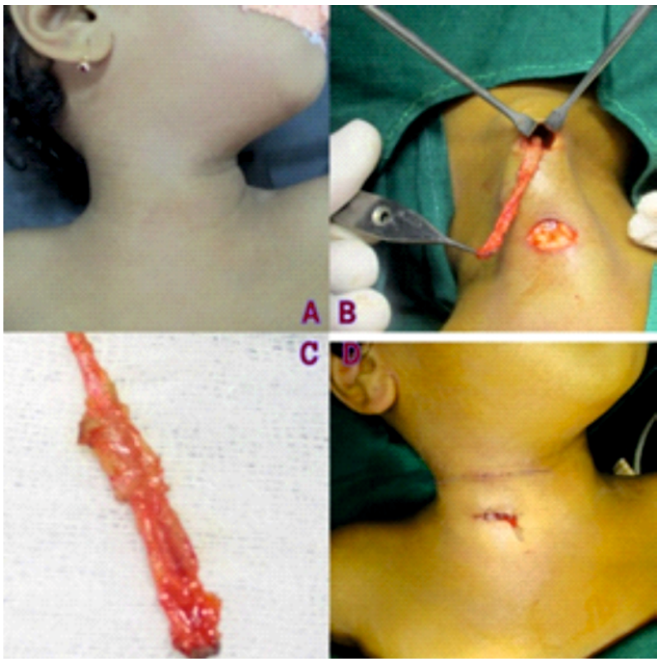


Fig. 4: A: opening of sinus onto right side of neck; B: endoscopic dissection of branchial sinus; C: excised specimen; D: after wound closure



Fig. 5: A: Pre-operative view of external angular dermoid; B: showing access incision in scalp; C: cyst opened with contents; D: 1 month post-operative view

Table 1: demographic, surgical and outcome details:

S. No	Number of patients per diagnostic category	Ages of patients per diagnostic category and average age	Gender of patients per diagnostic category	Diagnosis	Procedure	Number of procedures	Duration of surgery-range	Average duration of surgery	Pain score	Satisfaction level
1	1	45y	1M	Brow ptosis	Brow lift	1	2hrs		<4	9-10
2	2	18Y, 10Y= 14Y	1F, 1M	External angular dermoid	Endoscopic excision	2	1hr, 45mins	52.5mins	<4	9-10
3	2	47Y, 50Y=48.5Y	2F	Frontal osteoma	Endoscopic ostectomy	2	25mins, 30mins	22.5mins	<4	9-10
4	4	29Y,38Y,22Y,12Y=50.5Y	3F, 1M	Lipoma of forehead	Endoscopic excision	4	10-50mins	30mins	<4	9-10
5	1	29Y	1M	Depressed fracture of frontal bone	Endoscopic elevation and repositioning	1	25mins	25mins	<4	9-10
6	2	62Y, 24Y=43Y	2M	Orbital fractures	Endoscopic aided medial orbital wall repositioning with nasal septal graft	2	1hr 15mins-1hr 40mins	87.5mins	<4	9-10
7	1	24Y	1M	Orbital fracture	Endoscopic aided orbital floor reconstruction with bone graft	1	1hr 30mins	1hr 30mins	<4	9-10
8	2	26Y, 35Y=30.5Y	2F	Vascular malformation of cheek	Intraoral endoscopic excision	2	1hr 20mins- 2 hrs	1hr 40mins	<4	9-10
9	1	25Y	1M	Sebaceous cyst of left cheek	endoscopic excision	1	1hr 10mins	1hr 10mins	<4	9-10
10	1	14Y	1F	Anomalous opening of parotid duct- left	Oral diversion-endoscopy aided	1	1hr 40mins	1hr 40 mins	<4	9-10
11	1	27Y	1F	Benign masseteric hypertrophy	Intra oral endoscopic bilateral masseter reduction	1	2hrs 10mins	2hrs 10mins	<4	9-10
12	1	18Y	1F	Branchial sinus	Endoscopic excision	1	40mins	40mins	<4	9-10
13	7	13Y, 14Y, 17Y, 26Y, 6Y, 22Y, 18Y = 58Y	4F, 3 M	Congenital torticollis	Trans-axillary endoscopic release	7	30mins-1hr 20mins	55mins	<4	9-10
14	1	37Y	1F	Right sided Facial palsy	Endoscopic aided temporalis muscle transfer	1	2hrs 10mins	2hrs 10mins	<4	9-10
15	1	29Y	1F	Depression of right cheek	Endoscopic aided dermis fat grafting	1	1hr 45 mins	1hr 45 mins	<4	9-10
16	1	17Y	1M	Fibrous dysplasia of maxilla	Endoscopic excision of the lesion	1	1hr 50 mins	1hr 50 mins	<4	9-10

F: Female; M: Male

in the head and neck region, like parotid and submandibular gland tumours, going through hair-line incisions[7].

In our series, the indications for subsurface endoscopic surgery ranged from subcutaneous swellings to restricting bands, as in torticollis. In some cases, the procedure was endoscopy aided in the creation of a subcutaneous pocket for placement of a dermis-fat graft.

The pain was significantly less than in open procedures. Early rehabilitation could be undertaken after sternomastoid division as the scar was placed in the axilla, remote from the area of muscle division. The cosmetic outcome of the procedure was excellent, as judged by patients and relatives after six weeks except in the case of excision of an external angular dermoid who had temporary weakness of the frontal branch of facial nerve.

Retention of subcutaneous spaces created by dissection needs retractors that enable subsurface manipulation of tissue with instruments and electrocautery. In our series, standard retractors, the Killian retractor or self-retaining retractors were used. Unlike cavitary endoscopy with preformed working spaces which can be easily distended by gas, subcutaneous endoscopy entails dissection of spaces and retention in all axes to facilitate dissection. Spaces with a firm base like the frontal bone lend themselves to easier dissection.

The hidden scars after surgery add to patient satisfaction. Follicle-sparing hairline incisions and careful closure prevent any alopecic scars.

CONCLUSION

All 29 endoscopic procedures could be conducted safely and with excellent results.

CLINICAL SIGNIFICANCE

Subsurface endoscopic procedures are easily performed with moderate endoscopic training and the results are superior to open procedures in terms of patient satisfaction, safety, reduced post-operative pain and avoidance of visible, unsightly scars.

Conflict of Interest: None

Funding: None

Written Consent: Taken

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