



CRITICAL EVALUATION OF COMPLICATIONS OF NECK DISSECTION

Dr Ahmad Rizvan*	MS, Dept Of ENT, Command Hospital (northern Command) *Corresponding Author
Prof Rajnish Talwar	MS, Dept Of Oncosurgery, Command Hospital (Eastern Command), Kolkata
Prof S B Mahajan	MS, Dept Of ENT, Command Hospital (Eastern Command), Kolkata
Prof B K Prasad	MS, Dept Of ENT, Command Hospital (Eastern Command), Kolkata
Dr Nikhilesh E	Dept Of ENT, Command Hospital (Northern Command)
Dr Gajbhiye D J	Dept Of Anesthesiology, Command Hospital (Northern Command)

ABSTRACT **BACKGROUND:** Radical neck dissection is a reliable method of treating patients with head and neck cancer; it carries substantial morbidity and complications. This surgery has become a routine in many oncological centres but knowledge of possible complications and their management is a must for treating surgeons

METHODS: In this study 60 patients undergoing neck dissection as elective or therapeutic, comprehensive or selective, as a sole procedure or combined with other surgery, with or without other modalities of treatment were selected and managed and all the complications were critically analysed.

RESULTS: A total of 26 complications (43.3%) occurred in this study. There were 7 cases of thoracic duct injury (11.6%), 5 cases of post operative chyle leak (8.3%) and 2 cases of RLN injury (3.3%) and 1 case of injury to main trunk of facial nerve (1.6%), 2 patients had temporary paresis of marginal mandibular nerve (3.3%). Post operatively marginal necrosis of skin flap was present in 8 patients (13.3%) and 1 patient had facial and glottic oedema (1.6%).

CONCLUSION: Despite the best planning, complications can still occur but their impact can be minimised by a vigilant and proactive emphasis in the entire peri-operative period.

KEYWORDS : Neck dissection, complications, chyle

INTRODUCTION

Radical neck dissection (RND) remained the standard treatment for palpable or potential cervical metastasis from head and neck cancer for many decades since its original description by Crile in 1906 and subsequent popularisation by Hays Martin in 1951.^{1,2}

The recurrence rates after RND vary according to the size of the neck disease, ranging from less than 10% in the N0 neck to over 70% in patients with positive nodes at multiple levels.³

The use of either pre- or post-operative radiation therapy further decreases the incidence of failure in the neck by at least 50% for all N stages.^{4,5}

Radical neck dissection carried substantial morbidity and complications. Nahum described 'shoulder syndrome' following radical neck dissection.⁶

The aetiology of this syndrome is in part sacrifice of the spinal accessory nerve (SAN) with preservation of that structure during neck dissection ameliorating the syndrome.⁷

The morbidity of the classical RND thus gave impetus to the development of modified procedures that attempted to reduce the adverse effects which is credited to Bocca.⁸

It is imperative that complications of such surgery and their attendant morbidity are minimised. Morbidity is best minimised by a meticulous approach which begins in the out-patient setting. The ultimate complication of neck dissection is residual or recurrent tumour, a logical approach should permit maximum eradication of disease and improve survival whilst minimising hospital stay, complications and even mortality.

OBJECTIVES OF STUDY

To identify and critically evaluate the complications of neck dissection

MATERIALS AND METHODS

Study design: Descriptive prospective study

Study Population: All patients of head and neck malignancy undergoing Neck Dissection in Command Hospital (Eastern Command), Kolkata.

Study Period: The study was conducted over a period of three years from March 2009 to Mar 2012.

Sample Size: 60 consecutively selected patients undergoing neck dissection as elective or therapeutic, comprehensive or selective, as a sole procedure or combined with other surgery, with or without other modalities of treatment of head and neck cancers in Command Hospital (Eastern Command) Kolkata were included in the study.

Study Technique:

Patients were worked up with detailed history, examination and investigations. Important findings were noted and decisions made in the joint Head and Neck Clinic and were endorsed in the performa. Technical details of neck dissection with important findings were noted and the patients were managed post operatively on a day to day basis and complications were noted with their management. Subsequent review of patients was done in the follow up visits and findings noted in the performa.

RESULTS

Age and gender distribution:

Table 1.01

Age (years)	Number	Percentage
Less than 45	8	13.3%
45 to 65	42	70.0%
More than 65	10	16.7%
Gender	Number	Percentage
Male	32	53.3%
Female	28	46.7%

Upfront surgery versus post radiotherapy surgery:

Table 1.02

Timing of surgery	Number	Percentage
Upfront	46	76.6%

Post radiotherapy	14	23.4%
-------------------	----	-------

A total of 26 complications (43.3%) occurred in this study. There were 7 cases of thoracic duct injury (11.6%), 5 cases of post operative chyle leak (8.3%) and 2 cases of RLN injury (3.3%) and 1 case of injury to main trunk of facial nerve (1.6%), 2 patients had temporary paresis of marginal mandibular nerve (3.3%). Post operatively marginal necrosis of skin flap was present in 8 patients (13.3%) and 1 patient had facial and glottic oedema (1.6%).

COMPLICATIONS

Total No. of patients= 60			
Total No. of complications= 26			
Per op complications= 12		Post op complications= 14	
	1st 24 hours	Early (1-5 days)	Late (Beyond 5 days)
	Nil	14	Nil

ILLUSTRATING PHOTOGRAPHS



Fig 1.01 Post operative chyle leak



Fig 1.02 Patient being taken up for type 1 thyroplasty after 1 year



Fig 1.03 Marginal necrosis of skin flaps



Fig 1.04 Modified Schobinger incision with lazy 'S'

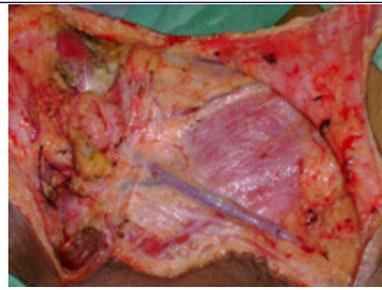


Fig 1.05 Sub platysmal flap to maximise blood supply to flaps

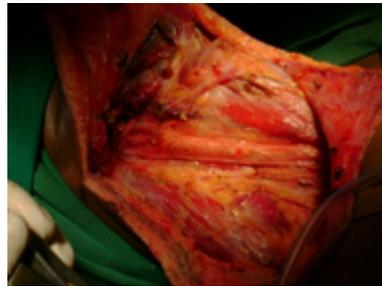


Fig 1.06 Neck bed after RND

DISCUSSION

In our study there were a total of 22 complications (36.6%) out of which 12 complications were per operative (20%) and 10 complications were post operative (16.6%). Other studies report complication rates from 38% to up to 50.8%.^{9,10}

In our study there were seven cases (11.6%) of thoracic duct injury out of which 6 were identified per operatively and managed with figure of 8 suture using 4-0 prolene. No further leak was confirmed using valsalva manoeuvre and Trendelenburg position and patients did well post operatively. However, 1 patient developed chyle leak on 4th post operative day which was managed conservatively by keeping the patient nil orally and keeping him on total parenteral nutrition for 5 days. 4 patients did not have any obvious thoracic duct injury but developed chyle leak later on but all of them were managed conservatively.

As per other studies chyle fistulae are seen in less than 20% cases of neck dissection. In a study done at the Cancer Institute, Madras, India¹¹, chyle leaks were seen in 19 patients out of which the leak subsided spontaneously in sixteen patients (84.2%) with conservative management where as the neck was re-explored in three patients (15.8%). They concluded that conservative management in the form of aspirations and strapping is more likely to succeed when the volume of drainage is low or decreasing over time and the surgical incision and skin flaps remain healthy. In our study we had vacuum drains already in place so no aspirations and strapping was required and all the patients were managed by dietary modifications only.No case of chyle leak required re exploration.

A thorough knowledge of the anatomy of lymphatic pathways from the thorax and abdomen, identification of the thoracic duct during surgery and detection and ligation of all lymphatic leaks intraoperatively using a Trendelenburg position and Valsalva manoeuvre could have been the reason for no major chyle leaks post operatively as advised by Smoke et al.¹²

Other studies¹³ also proposed conservative treatment with fat restricted diet or total parenteral nutrition reducing the volume of chyle production and operative management with exploration of the neck or if necessary open thoracotomy to ligate the thoracic duct with an incidence rate of 1 to 2%.

.Gavilan et al reported incidence of chylous leak to be 1 to 2.5% and suggested further decreasing the chances of chyle leak by thoracic duct ligation and surrounding it by muscle, fascia or adipose tissue to avoid sectioning its thin wall with ligature.¹⁴

Intra operative use of indocyanine green (ICG) fluorescence lymphography and use of 131I-fat for the successful intraoperative

detection of the exact site of a fistula are found in literature¹⁵ as well as use of fibrin sealant, collagen felt, polyglactin 910 mesh, and muscle flaps to decrease the chances of chyle leak.¹⁶

In our study there were 8 cases of marginal necrosis of skin flaps usually starting at the 'T' junction of modified Schobinger incision and then spreading. However, all cases were managed conservatively with good wound care, saline dressings and in some cases secondary suturing. The risk of carotid exposure was minimal in such cases because as a part of training we use to give lazy 'S' vertical limb of modified Schobinger incision away from the carotid.

Balstone et al¹⁷ in their study found that skin flap necrosis can have several causes, such as design errors, elevation, poor handling, or improper postoperative care. Pre-existing scars, prior radiation therapy, hematoma, infection, and poor nutrition can contribute to skin flap loss. If skin flap necrosis occurs and the carotid is not exposed, a conservative approach is mandatory

In our study the flaps were raised in subplatysmal supravenuous plane. They were frequently moistened during surgery and were covered with moist cotton gauzes. After surgery the wound was closed in single layer with staples after removing 2-3mm of flap edges. Tracheostomy incision was not incorporated into the main surgical field and active drains were used through separate puncture to prevent any collection and to promote good approximation of flaps to the neck bed.

In our series marginal mandibular nerve paresis occurred in 2 cases (3.3%). There was one case of injury to the main trunk of facial nerve (1.6%) and 2 cases of injury to the recurrent laryngeal nerve (3.3%). Out of the 2 cases of RLN injury one patient had vocal cord compensation from the other side while the other had to undergo type 1 thyroplasty after a period of 1 year.

In a retrospective study by Prim, De Diego et al¹⁸ paralysis of the 11th nerve occurred in 12 cases (1.68%), marginal mandibular paresis was observed in nine cases (1.26%), Bernard-Horner's syndrome and hypoglossal nerve paralysis were noted in four and three cases (0.56 and 0.42%), respectively.

In our study both the cases of marginal mandibular injury recovered in a few days and most probably were due to stretch on the flaps by the retractors. One case of facial nerve injury occurred in a case where there was high fixed level 2 lymph node on the right side and the trunk inadvertently got injured while dissecting the node. Both the cases of recurrent laryngeal nerve injury were revision cases and the nerve most probably got injury while dissecting level 4 lymph nodes on the left side.

In our study one patient developed glottic oedema with facial swelling after bilateral MRND and had to undergo emergency tracheostomy.

Perzik et al¹⁹ recommended elective tracheostomy in all cases undergoing simultaneous bilateral neck dissection.

However, with a meticulous and a protocol driven approach and non of the complications that occurred in our series affected the survival rate of the patients.

CONCLUSION

Over the past century the neck dissection, whether performed in isolation or integrated with a more major resection, has become the accepted face of head and neck oncology. Since it is carried out with such regularity it has the potential to be considered as routine. However in common with many procedures the appreciable potential morbidity and indeed mortality should not be underestimated by junior and seniors surgeons alike. Whilst a meticulous, almost protocol-driven approach should be employed throughout, any one patient's needs can only be truly addressed by an individual approach. Despite the best planning complications can still occur but their impact can be minimised by a vigilant and proactive emphasis in the entire peri-operative period.

CONFLICT OF INTEREST

Nil

REFERENCES

1. Crile G. Excision of cancer of the head and neck with special reference to the plan of dissection base of one hundred and thirty-two operations. *JAMA* 1906; 47: 1780-6.

2. Martin H, Delvalle B, Enrich H, Cahan EG. Neck dissection. *Cancer* 1951; 4: 441-99.
3. Strong EW. Preoperative radiation and radical neck dissection. *Surg Clin N Amer* 1969; 49: 271-6.
4. Goffinet DR, Fee WE, and Goode RL. Combined surgery and postoperative irradiation in the treatment of cervical lymph nodes. *Arch Otolaryngol* 1984; 110: 736-8.
5. Vikram B, Strong EW, Shah JP, Spiro R. Failure in the neck following multimodality treatment for advanced head and neck cancer. *Head & Neck Surgery* 1984; 6:724-9.
6. Nahum AM, Mullally W, Marmor L: A syndrome resulting from radical neck dissection. *Arch Otolaryngol* 1961, 74:82-86.
7. Short SO, Kaplan JN, Laramore GE, Cummings CW. Shoulder Pain and Function After Neck Dissection with or without Preservation of the Spinal Accessory Nerve. *Am J Surg* 1984; 148: 478-82.
8. Bocca E, Pignataro O, Oldini C, Cappa C. Functional neck dissection: an evaluation and review of 843 cases. *Laryngoscope* 1984; 94: 942-5.
9. McGuirt WF, McCabe BF, Krause CJ. Complications of radical neck dissection: A survey of 788 patients. *Arch Otolaryngol* 1981; 107(8):497-9.
10. Davidson BJ, Newkirk KA, Harter KW, Picken CA, Cullen K J, Sessions RB. Complication from planned neck dissections. *N Engl J Med* 2004; 350:1937-44.
11. Kannan RR, Mahajan V, Ayappan S. Management of chyle fistulae following surgery in the neck. *Indian J Cancer*. 2001 Jun-Dec; 38(2-4):117-20.
12. Smoke A, Delegge MH: Chyle leaks: consensus on management? *Nutr Clin Pract* 2008, 23(5):529-32
13. Raguse, Pfitzmann R, Bier J, Klein M. Thoracic leak in neck dissection. *Oral Oncology* 1993; 44(Issue 8): 812-19
14. Gavilan J, Herranz J, De Santo W and Gavilian C.. Functional and selective neck dissection. *British J of Oral and Maxillofacial surgery*. 2003; 41: 208
15. SURGERY TODAY Volume 39, Number 5, 421-424, DOI: 10.1007/s00595-008-3852-1
16. Wangb Y J, Liu K, Zhang W F, Zhang G C, Cai Z J. Intra operative determination of thoracic duct injury with I 131-fat. An experimental study on dogs. *Chin Med J (Engl)*. 1989 Feb; 102(2):86-90.
17. Baistone MD, Lowe D, Shaw RJ, Brown JS, Vaughan ED, Rogers SN: Passive versus active drainage following neck dissection: a non-randomised prospective study. *Eur Arch Otorhinolaryngol* 2009, 266(1):121-4. Epub 2008 Jun 12
18. Prim, Diego D, Verdaguer, Sastre and Rabanel. Neurological complications in Functional Neck Dissection. *Arch Otolaryngol Head Neck Surg* 1991; 117:601-5
19. Perzik S L. One stage bilateral neck dissection- Indication and technique. *Calif Med*. 1953 April; 78(4):288-292.