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Sternocleidomastoid musculocutaneous flap: A viable option to seal off the post traumatic fistulas of neck

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Abstract

Introduction: Pharyngo/laryngo-cutaneous fistula in the neck is a troublesome complication after penetrating injuries. The objective of this report is to describe the utility of a sternocleidomastoid musculocutaneous flap as a viable tissue buttress for repairing a frank clinical fistula following penetrating injuries to the neck.

Materials and Method: The procedure was done in three consecutive patients who clinically presented with fistulous communication of either pharynx or larynx. The etiology in all the patients was penetrating injury to the neck.

Results: There was no recurrence of leakage in the postoperative period. All the patients had good aesthetic results and could take liquids & solids well.

Conclusion: Sternocleidomastoid musculocutaneous flap is a good, locally available option to seal off the post traumatic fistula.

Keywords: Sternocleidomastoid flap, Neck, Fistula, Traumatic

Introduction

A post traumatic neck fistula is an irritating and intractable complication following penetrating injuries to the neck. Significant challenges are associated with the management and treatment of these fistulas. These fistulae prolong the hospital stay of the patient.

Necessary requirements for the successful management of these fistula are the following: functional closure of the defect, control of infection, shortened period of hospitalization, and minimal donor – site morbidity. A sternocleidomastoid (SCM) muscle flap meets all these requirements. The SCM muscle has a number of uses in reconstructive surgery of the head and neck region and most small or medium sized defects can be closed by use of this muscle flap.

The SCM constitutes an important surgical landmark in the neck. It originates from two heads. The sternal head originates from the upper part of the anterior surface of the manubrium sterni. The clavicular head is flattened and takes origin from the medial one third of the superior surface of the clavicle. The muscle is inserted to the lateral surface of the mastoid process and lateral part of the superior nuchal line. The fibres of the muscle cross in such a manner that the clavicular fibres are inserted on to the mastoid process and the sternal fibres are inserted to the superior nuchal line. Branches from the ventral rami of the second, third, and sometimes fourth, cervical spinal nerves also enter the muscle. It receives its blood supply from branches of the occipital and posterior auricular arteries, which supply the upper part of the muscle.[(1)]

In this article, we describe the utility of a SCM musculocutaneous flap, as a buttress for repairing the post traumatic neck fistulas.

Patients and Method

Over a period of one year, from Dec 2010 to Jan 2012, three patients with fistulas in the neck following penetrating injuries underwent sternocleidomastoid musculocutaneous flap cover during the repair.

Case 1: A 10-year-old girl with a one month old history of fall from tree presented to the OPD with pharyngocutaneous fistula on the right side of the neck (Fig. 1). The child was managed with Ryle's tube feeding and dressings at the district hospital and later, referred to our centre.

Case 2: A 27-year-old male with homicidal cut injury throat and left eye injury presented to the emergency(Fig. 2). Tracheostomy was done by ENT team and a Ryle's tube was placed for feeding. An orocutaneous fistula became evident on third day and the patient was referred for plastic surgery intervention.

Case 3: A 32-year-old female with two weeks old post-electric burn injury over neck in the midline presented with laryngocutaneous fistula (Fig. 3-5). There was no communication with the pharynx and no leakage of oral feeds.

Operative procedure: Under general anaesthesia, nasogastric tube was placed with the head turned to opposite side. Surgical debridement of the cavity was done and devitalized tissues around the fistula removed. The edges of the fistula was refreshed and repaired primarily in two layers.

A superiorly based sternocleidomastoid musculocutaneous flap was planned & marked. Incision was made around the skin paddle down to the muscle fascia, which was anchored to the skin with several interrupted sutures. The muscle was dissected and elevated by incising the fascia along the anterior and posterior borders of the sternocleidomastoid muscle

belly. The dissection then was continued by scissors to free and elevate the muscle pedicle from the deeper half of the split cervical fascia. Care must be taken to avoid damaging the spinal accessory nerve passing through or under the sternocleidomastoid.

The superiorly based muscle with the overlying skin paddle was transposed into the defect and flap was sutured to the outer margin of the defect. A continuous negative pressure drain was kept in place for at least 48 hrs.

Removal of skin sutures was done on the eighth or ninth postoperative days. Nutrition of the patients was commenced during the second postoperative day assisted by a nasogastric feeding tube. Gastrografin study was performed on 8^{th}-9^{th} postoperative day where it revealed no leak. Thereafter, nasogastric tube was removed and oral feeding was started. Follow up of the patients for six months revealed no recurrence of fistula.

Results

In our series, a total of 3 patients with fistulas underwent sternocleidomastoid musculocutaneous flap cover. None of the closures failed, and we obtained good functional and aesthetic results.

Fig. 1: A 10-year old girl with fistula following fall from tree

Fig. 2: A 27-year old man with homicidal cut injury neck

Fig. 3: A 32-year old female with post – electric burn laryngocutaneous fistula

Fig. 4: Total area of defect after debridement

Fig. 5: Photograph of the same patient on seventh postoperative day. Note some minimal discoloration of the skin paddle

Discussion

Diagnosis of pharyngocutaneous fistula is based essentially on clinical symptoms as the development of early postoperative wound infection, throat/neck pain, subcutaneous air in the neck, odynophagia, cellulitis, mediastinitis, with/without evidence of systemic sepsis.[2-5]

Han et al[5] verified in their study that plain X- ray lateral view may show air in the soft tissues or widened retropharyngeal space, and the contrast study helps in identifying the location and extent of perforation. However he concluded that a negative radiological examination does not rule out pharyngeal injury and most diagnoses are based on clinical symptoms.

A fistulous communication between the pharynx and neck is difficult to manage. The SCM flap is a

viable surgical alternative for head and neck reconstruction. Classified by Mathes and Nahai[6] as a type II muscle, the SCM muscle has tripartite blood supply, and the dominant pedicle comes from the branch of the occipital artery entering on the deep surface of the upper third of the muscle belly. The two heads of the SCM muscle can be split cranially and the use of the sternal head through to the occipital artery allows the minor pedicle and the clavicular head to remain in situ. The procedure provides the safe SCM muscle flap reconstruction without the resulting possibility of a flat neck deformity.[7] The use of SCM muscle flaps in non-oncologic patients for the repair of oesophageal perforations caused by trauma or iatrogenic injury has already been explored.[8-10]

It is difficult to mobilize wound edges for a tension free closure with primary repair alone. The presence of nonviable tissue at the lesion together with poor soft tissue coverage of the repair site may result in the wound failing to heal. For these reasons, the muscle not only serves as a buttress reinforcing the repair, but also provides a well-vascularized tissue to improve the healing of the wound.[11]

The necessary requirements for the successful management of fistula are the following: functional closure of the defect, control of infection, shortened period of hospitalization, and minimal donor – site morbidity. A sternocleidomastoid (SCM) muscle flap meets these requirements.[11] When the SCM flap is applied in non-oncologic patients, flap-related complications are less as compared to oncologic cases. Most complications result from wound infection, dehiscence and superficial skin loss which are all related to the cutaneous portion of the SCM myocutaneous flap. As an alternative, the pectoralis major (PM) myocutaneous flap has been used frequently in head and neck reconstruction. Unlike the SCM muscle, the PM myocutaneous flap has a bulky appearance with distortion of the chest contour and requires a neighbouring donor-site dissection. Several revisions are usually needed to obtain a satisfactory functional and cosmetic outcome.

Conclusion

Sternocleidomastoid musculocutaneous flap is a good, locally available option to seal off the post traumatic fistulas of neck.

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