Surgery in the form of neck dissection forms a principal modality in the management of metastatic neck disease. Since Crile's first neck dissection in 1906 numerous incisions have been described. The wide range of approaches partly reflects diverse clinical scenarios, but also the inherent limitations of each incision.

The ideal incision for a neck dissection is safe, provides good exposure and flexibility in the event of unforeseen intra-operative findings, it is extendable to allow primary tumour resection and inclusion of a tracheostoma, allows for various reconstruction flaps, has a minimum incidence of post operative complications, and is cosmetically acceptable.

An appreciation that the vascular supply to the neck was fundamental to the survival of neck flaps in the early post operative period played a key role in the evolution of various approaches. Currently, no single incision uniformly satisfies the required criteria for all clinical situations. We present our preferred approach in the form of the modified J incision in our series of 116 patients at Aberdeen Royal Infirmary (ARI).

Surgical technique, material and methods
The modified J incision (Pictures 1-4) is used for exposure of level I to VI lymph node groups associated...
with cancers arising in the larynx, pharynx, or other midline visceral structures. The vertical limb takes origin just anterior to the mastoid tip and follows and overlies the anterior border of the trapezius muscle; extends inferiorly, and curves obtusely across the posterior triangle at approximately 3cm above the clavicle, and runs parallel to the clavicle to the anterior border of sternocleidomastoid muscle. The horizontal arm of the J incision is flexible in terms of its location and length. It can be extended across the midline if laryngopharyngectomy is to be included in the procedure. The tracheostoma can be incorporated either in the horizontal limb or placed below through a separate small horizontal incision.

The vertical arm of the incision is placed overlying the anterior border of the trapezius muscle as the underlying muscle supports the posterior part of elevated skin flap. It is our contention that such placement of vertical limb of the incision is not only physically supported by the underlying muscle but may even derive blood supply from it. The skin flap is elevated subplatysmally in the standard manner. If necessary the incision can be extended across the midline to create a symmetrical, broadly based apron flap for bilateral dissections. The blood supply to this flap is derived primarily from the cutaneous branches of the facial artery. At the completion of the procedure the incision is repaired over closed suction drain in two layers.

Results

From January 1997 to January 2007 the senior author (AH) surgically managed 116 patients with cervical malignancy by neck dissection. A retrospective review of case notes showed that 116 patients underwent neck dissections via modified J incision. There were 88 males and 28 females, average age 60 years (range 29 - 92 years).

Of the 116 neck dissections 24 were bilateral, 54 right sided, and the remaining 38 left sided. Majority of patients underwent a modified radical neck dissection preserving one to three non-lymphatic structures while 30 patients had a radical neck dissection.

Majority of these patients received post-operative radiotherapy but a small percentage had undergone radiotherapy as a primary treatment. In all cases closed suction drains were employed under the skin flaps for 4-6 days. Follow-up ranged from 6 weeks to 5 years.

Complications purely related to the incision were recorded in two patients. One patient who underwent bilateral J incision for neck dissection with total laryngopharyngocervical oesophagectomy and pectoralis major myocutaneous flap, developed minor epidermolysis of the skin flap at the junction of vertical with horizontal arm on the left side. The epidermolysis did not proceed to full thickness loss of skin flap or wound dehiscence.

The second complication was a partial dehiscence of the wound of less than 30mm in length. This was after a second J incision for recurrent neck disease, eleven months following a Radical Neck Dissection with post-operative radiotherapy. The second incision was placed 25mm behind the original incision. Our interpretation of this event is that the blood supply was already compromised at the time of the second intervention and poor circulation to the skin edges failed to keep the distal portion of skin viable.

Both patients with skin viability compromise were managed with conservative measures and no surgical intervention was required to obtain total wound healing.

Discussion

The arterial supply to the skin of the neck stems from branches of the subclavian and external carotid arteries. The transverse cervical artery provides the vascular supply to
the lower half of the neck. The facial and submental arteries supply the skin of the upper neck anterior to the angle of the mandible. The occipital, posterior auricular and external carotid arteries supply the sternocleidomastoid muscle and the upper lateral neck skin. The platysmocutaneous branch of the superior thyroid artery supplies the anterior neck.

Any incision employed should not undermine in any way the primary objective of complete extirpation of disease because of concerns regarding exposure, complications or cosmesis. Complications relating to the incision are wound infection, wound breakdown, and occasional subsequent carotid artery exposure and rupture. For all these, radiotherapy is considered as a compounding factor to wound healing by reducing vascular recovery and promoting necrosis of the skin flaps. Most incisions incorporate vertical and horizontal elements, but of particular concern are incision patterns that incorporate trifurcations. The vascular supply to the apex of the trifurcation is maximally compromised and healing may be complicated by wound dehiscence, exposure of underlying vital structures, and scar contracture, especially if radiotherapy is to be employed.

The Y incision (Figure 1) provided good exposure but was associated with carotid artery rupture in patients receiving radiotherapy.

Babcock and Conley, (Figure 2), by introducing a larger anterior flap, reported a reduced incidence of ischemia in the posterior flap thus affording more protection, and a reduced risk of rupture, to the carotid artery. However, this was traded-off with a 22% reported necrosis in the anterior flap.

McFee is considered the main proponent of horizontal incisions for neck dissection (Figure 3). These yield favourable cosmetic results. However technically McFee incision is quite difficult and exposure is somewhat restricted. The horizontal skin flap needs to be constantly retracted by the assistant which can be tiresome.

In 1972 Hetter1 proposed the H incision (Figures 1-5), as a variation on a vertical incision to optimise recovery of the skin flaps. Paradoxically these were dogged with a high complication rate possibly due to insufficient drainage in the long superior based flaps.

Prior to 1994 the senior author’s preferred approach for neck dissection was the ½ H incision, but a 90% incidence of necrosis at the trifurcation point prompted the search for an alternative. Even though the half H incision for ipsilateral neck dissection provides good exposure, it suffers from frequent breakdown at trifurcation particularly in irradiated patients.

Eckert and Byars2 pioneered the J Incision (Figures 1-4), by extending the classic thyroidecromal neck incision laterally to the border of trapezius and superiorly to the mastoid process. Robbins et al.7 reviewed their experience over a period of ten years and recommended three non-trifurcate patterns i.e. modified apron, hockey stick and inverted hockey stick.

The modified J incision affords excellent exposure of the surgical field (Figure 3), good protection to the carotid artery, is suitable for bilateral neck dissections and is flexible in the event of unexpected pathological findings. It also allows incorporation of excision of primary tumour at the same time in most cases. It however cannot be used if mandibular swing is required for extirpation of primary tumour. By conferring protection to the pharyngeal and esophageal suture lines it reduces the incidence of pharyngocutaneous fistula, and its large superior base conserves the flaps vascularly. If reconstruction flaps are needed these can be easily incorporated, as can a tracheostomy. The incision mostly follows natural skin folds and provides good cosmesis (Figure 4). Patients who prefer to cover their tracheostoma in various ways will also obscure the horizontal line of the incision. The vertical section is optimally camouflaged in its lateral position.

Conclusion

Our experience with modified J incision for neck dissection has been very satisfactory. It has provided adequate exposure with a minimal complication rate and excellent cosmetic outcome without undue technical difficulty during the procedure. It has become our preferred incision for neck dissection for almost all cases and we would highly recommend this incision. The only time we employ different incisions is when mandibular swing is anticipated.

References