

Oroantral fistula: a complication of transantral ligation of the internal maxillary artery for epistaxis

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Abstract

Transantral ligation of the internal maxillary artery (IMAX) is a well-described option for surgical management of posterior epistaxis not controlled by anterior and posterior packing. Advocates for this procedure argue that it reduces the morbidity, length of hospital stay and financial cost associated with prolonged nasal packing. The procedure is carried out through a Caldwell-Luc approach and the IMAX is clipped in the pterygomaxillary fossa. Fashioning of a nasoastral window is optional and its inclusion usually depends on the integrity of the sinus ostium. The commonest complications of transantral IMAX ligation occur when local structures including the inferior orbital and anterior superior alveolar nerves are damaged. The incidence of oroantral fistula following IMAX ligation is very low but those cases reported have been associated with the failure to create a nasoastral drainage window. We report two cases of persistent oroantral fistula complicating transantral internal maxillary artery ligation. No nasoastral window was fashioned in either of these cases.

Key words: Oroantral fistula; Epistaxis; Post-operative complications

Introduction

Epistaxis is the commonest emergency requiring admission to the Otolaryngology Department (Small and Maran, 1984). The majority of nosebleeds originate from the anterior part of the nasal septum, supplied by Kiesselbach's plexus. These are branches of the anterior ethmoidal artery, the internal maxillary artery and the sphenopalatine artery. The majority of anterior nosebleeds can be controlled with chemical or thermal cautery if direct or endoscopic visualization is possible (Murray, 1988). If direct visualization of the bleeding point is not possible, it may be necessary to use anterior and sometimes posterior nasal packing. Nasal packs are uncomfortable as well as being associated with a high morbidity and even mortality (Wetmore *et al.*, 1988).

Transantral ligation of the internal maxillary artery was described by Seiffert in 1928 and popularized by Chandler and Serrins in 1965 for management of intractable epistaxis. The approach described was by a Caldwell-Luc incision for access to the maxillary antrum. The posterior wall of the antrum was removed and the internal maxillary artery clipped several times in the pterygomaxillary fossa. A nasoastral window was not deemed necessary in all cases but was advised if there was any doubt about the integrity of the sinus ostium.

Complications of this procedure have been described in detail in the literature, including haemorrhage, facial numbness, and desensitization of teeth. Few series have described oroantral fistulas as a complication of this procedure but those who have done so have attributed it to the failure to create an inferior meatal antrostomy at the time of surgery.

We present two cases of oroantral fistulae following transantral ligation of the internal maxillary artery for management of intractable epistaxis. Neither of these

patients had a nasoastral window fashioned. We propose that this should be mandatory in this operation to avoid further occurrence of this complication.

Case reports

Case 1

A 34-year-old normotensive man was admitted as an emergency with a 24-hour history of spontaneous right-sided epistaxis. This failed to settle with nasal packing. There was no past history of bleeding disorders or of any other serious illnesses. The patient smoked 10 to 15 cigarettes a day, consumed about 60 units of alcohol weekly and was not on any regular medication. No anterior septal or lateral wall bleeding points were obvious and a Merocel 8 cm pack was inserted into the right nostril, that initially controlled the bleeding. Full blood count and clotting studies were within normal limits. Over the following 12 hours he had four moderately severe brisk bleeds from the right nostril. He was taken to theatre where examination under anaesthesia revealed a few bleeding vessels on the middle turbinate which were cauterized. The nose was packed with a bismuth iodoform paraffin paste (BIPP) dressing. On return to the ward, the patient became distressed and pulled out his own packs. He continued to bleed and was taken back to theatre later that same night for transantral ligation of the right internal maxillary artery (IMAX), and ligation of the right anterior ethmoidal artery. A Caldwell-Luc approach was used for the IMAX ligation and no nasoastral window was fashioned. The patient was kept ventilated and sedated on the intensive care unit for 24 hours following the operation in order to minimize his risk of rebleeding. Three units of packed cells were required peroperatively.

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He was placed on broad spectrum antibiotics as a prophylactic measure. Nasal packs were removed 48 hours post-operation and he suffered no further bleeds.

On the fifth in-patient day, the patient discharged himself from hospital against medical advice. On review in the outpatient clinic four weeks later, he complained of right-sided facial pain and a foul taste in the mouth. Examination showed an oroantral fistula at the site of the Caldwell-Luc incision. He was placed on antibiotics and readmitted three weeks later for closure of the oroantral fistula, removal of any antral disease, and fashioning of an inferior meatal antrostomy. However, he continued to feel liquids going into his nose on drinking, and required a further procedure under local anaesthetic to finally close the oroantral fistula.

Case 2

A 54-year-old normotensive woman was admitted from the casualty department with a 24 hour history of recurrent heavy right-sided epistaxis. She had no past history of epistaxis or other bleeding disorders. On admission, she required posterior and anterior nasal packing with a Foley catheter balloon and BIPP, but continued to bleed heavily despite conservative management for 24 hours. Examination under anaesthetic of her nose on the second in-patient day revealed arterial bleeding from the lateral wall but it was impossible to visualize the bleeding point. A moderate sized postnasal space pack was thus inserted and the nasal cavity was packed with BIPP. Clotting studies were normal. Four units of packed cells were transfused.

The patient continued to bleed through this pack and on the fourth in-patient day she returned to theatre for transantral ligation of the right internal maxillary artery and ligation of the right anterior ethmoidal artery. The buccal mucosa was closed with catgut sutures. No inferior meatal antrostomy was fashioned. Epistaxis persisted after this procedure but gradually decreased in frequency and severity and the patient was discharged home on the eighth day.

Three days following her discharge from hospital, she was readmitted with a further severe right-sided epistaxis. A course of tranexamic acid was commenced and she was discharged home two days later, with no further epistaxis. Two weeks later the intraoral antrostomy wound had not healed and it remained dehiscent at the next visit six weeks later. Closure of the oroantral fistula was performed under local anaesthetic. The fistula persisted despite a further attempt to close it under local anaesthetic. Nine months later the patient still had a persistent oroantral fistula and there was radiological evidence of maxillary sinus infection. A formal re-opening of the Caldwell-Luc incision, clearance of the maxillary antrum and fashioning of inferior meatal antrostomy was performed. At follow-up visit six weeks later the fistula had closed.

Discussion

The Caldwell-Luc operation was first described in the early 1890's for the treatment of chronic rhinosinusitis. A radical maxillary antrostomy was created, the sinus stripped of diseased mucosa and a nasooantral window was fashioned in the inferior meatus (Macbeth, 1968). Complications of the Caldwell-Luc operation include facial swelling, pain and/or numbness of the face, teeth and gums (Murray, 1983; DeFreitas and Lucente, 1988; Low, 1995) and less commonly post-operative epistaxis, oroantral fistulae, epiphora and dental discolouration (Low, 1995), blindness (Johnson and Parkin, 1976) and dental root fractures (Jerome, 1994).

Since the advent of functional endoscopic sinus surgery (FESS) the Caldwell-Luc operation has been performed less frequently. It remains however a useful approach to the pterygomaxillary fossa frequently for IMAX clipping. Ligation of the sphenopalatine artery has been suggested as a technically easier and more accurate operation (Simpson *et al.*, 1982; Winstead, 1996). Stepnick *et al.* (1990) proposed an intraoral extra-maxillary sinus approach for ligation of the maxillary artery in order to minimize the possible complications.

Chandler and Serrins in 1965 popularized transantral ligation of the internal maxillary artery which had previously been described by Seiffert in 1928. The surgical anatomy of the pterygomaxillary fossa with respect to this procedure is well described in the literature (Pearson *et al.*, 1969; Lofgren, 1971). Early intervention with transantral IMAX ligation shortens hospital stay whilst decreasing morbidity and discomfort. (Allen, 1970; McDonald and Pearson, 1980; Nair, 1982; Schaitkin *et al.*, 1987; Metson and Lane, 1988). The failure rate for arrest of haemorrhage is between 10–13 per cent (Premachandra and Sergeant, 1993). This is possibly due to incomplete ligation of vessels, alternative dominance of vessels and reconstitution of flow through collaterals (Breda *et al.*, 1989). Embolization of the feeding arteries is possible in such cases but requires expertise in the technique. It is itself associated with complications which may be fatal in some cases (Lin, 1994).

The need to create a nasooantral window during transantral IMAX ligation is controversial. Chandler and Serrins (1965) thought it optional but Lofgren in 1971, McDonald and Pearson in 1980, and Spafford and Durham in 1992, were adamant that failure to do so would predispose to maxillary antral infection and subsequent oroantral fistulae. In a survey of 60 cases by Rosnagle *et al.* in 1973, routine nasooantral windows were not performed but no oroantral fistulae were noted among their complications. A nasooantral window is routinely created in the Caldwell-Luc operation for management of chronic rhinosinusitis.

The optimal position of the nasooantral window has been the topic of extensive research. Comparisons between the middle and the inferior meatal antrostomy have been carried out both in animal and in human subjects. Some studies demonstrated no difference in patency rates or in post-operative clinical and radiological findings (Arnes *et al.*, 1985; Benninger *et al.*, 1993). Drainage of the maxillary sinuses into the nose is dependent on mucociliary clearance through the natural ostium into the middle meatus. Middle meatal antrostomy therefore provides a physiological drainage route and this has been a central component in the success of FESS (Stammberger and Posawetz, 1989).

From this experience, we would advocate that a middle meatal antrostomy should always be fashioned during transantral ligation of the IMAX in order to minimize the risk of developing an oroantral fistula. The rationale behind arterial ligation for intractable epistaxis is first and foremost to reduce morbidity, hospital stay and medical cost. However, these aims would be defeated if further surgery and follow-up is required to manage complications of the procedure.

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