

A critical audit of the surgical management of intractable epistaxis using sphenopalatine artery ligation/diathermy*

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SUMMARY

An audit of the local practice of sphenopalatine artery (SPA) ligation/ diathermy was undertaken following its introduction to the unit in April 1998. The authors looked to the literature for evidence of what was to be taken as a successful result and were surprised at the lack of published data on its efficacy or lack thereof.

Fivehundredsixtythree patients were admitted for inpatient management of epistaxis over a two-year period. Ten of these patients required surgical control of epistaxis and went on to have either sphenopalatine artery ligation or diathermy. One had concomitant anterior ethmoidal artery diathermy. Postoperatively, the patients stayed between one to ten days (mean 3.3 days). The mean follow up in the clinic was 42.7 days. A recurrent bleed rate of 33% was found, which is higher than previously published results. Of these failures one had internal maxillary embolization followed by anterior ethmoidal artery ligation. The other two failures were successfully corrected with anterior ethmoidal ligation. The authors discuss and illustrate the possible reasons for failure.

Key words: sphenopalatine, ligation, artery, epistaxis

INTRODUCTION

Epistaxis is the commonest nasal emergency requiring hospital admission (Small and Maran, 1984). Its prevalence in the population is estimated to be between 10–12% (Shaheen, 1967), of which 10% seek medical attention (Ram et al., 2000). Of these, 1% will require surgery (Ram et al., 2000).

Traditionally, epistaxis was treated with nasal packing initially. This was done with anterior gauze (BIPP/Vasolene) packs and or Foley/Brighton intranasal balloons. Arterial ligation or embolization is then the second/last resort. This traditionally used to involve internal maxillary artery ligation via a Caldwell–Luc approach or ligating the external carotid artery in the neck (Pritikin et al., 1998). However recently ligation of the sphenopalatine artery endoscopically endonasally, as the most distal feeding vessel to the nose posteriorly (Sharp et al., 1997), has become a logical, effective (Shaheen, 1975) and more frequently done intermediary step. In 1976, Prades described the ligation of the sphenopalatine artery using the operating microscope, to control bleeding in his approach to the Vidian nerve (Prades, 1976). In 1987, microscopic clipping of the artery for recurrent epistaxis was described (Sulsenti et al., 1987) and in 1988 endoscopic electrocautery was described by Wurman et al. for posterior epistaxis (Wurman et al., 1988).

The use of the endoscope in FESS has meant that virtually every department in the UK has the potential to attempt to ligate the sphenopalatine artery. We audited our unit's ability to do just this.

MATERIALS AND METHODS

A retrospective audit of the notes of all patients having undergone SPA ligation was done over a two-year period. The surgical practice had changed at this unit at the start of the 2-year period to encompass SPA ligation. Firstly, the number of all admissions for epistaxis was obtained from the hospital audit department. The surgical theatres were then asked to provide from their computerised records all cases that had had arterial ligations for epistaxis during this period. The following data were recorded from the notes: age, sex, possible aetiology, relevant medical history, medication type, amount of blood transfused, type of procedure, length of hospital stay, follow-up and complications that had occurred. Success of the procedure meant that for the length of time since they had the procedure these patients did not require hospital attendance, and this was noted.

The patients were treated surgically as follows: all had general anaesthesia. The nose was prepared using a vasoconstrictor of

the surgeon's choice. The location of the bleeding area was assessed endoscopically. The common U shaped mucosal flap just posterior to the posterior fontanel was then raised. A meatal antrostomy was not done, and septal surgery was only done for access. The flap was elevated until the artery tethering the flap down was isolated. This was then clipped or diathermied (using bipolar forceps) according to the surgeon's preference. The nose was occasionally packed afterward loosely.

RESULTS

There were 563 patients treated for epistaxis as an inpatient in the hospital between April 1999 and April 2001. Of these 10 required SPA ligation/diathermy. The age of these ten patients ranged between 53 and 79 years (mean = 66.70 years). There were 6 females and 4 males.

Two patients were on NSAIDS, 3 had hypertension and 1 patient had had a FESS 15 days prior to presenting with posterior epistaxis. All patients were treated initially with either packs, postnasal balloons or both and one patient had to undergo anterior and posterior nasal packing under GA prior to SPA ligation. Coagulation abnormalities were investigated for. Failure of this conservative approach with nasal packing, and correction of coagulation, was the indication for surgical management in all cases regardless of duration of bleeding or concomitant therapy.

Three patients required SMR for access. Two patients had their SPA diathermied and the rest underwent clipping. One of the 2 patients above also underwent concomitant anterior ethmoidal diathermy as the bleeding was felt to be coming down from the area of the superior meatus anteriorly. The bleeding was assessed to be unilateral in all cases. However, there was poor exact localisation of a bleeding area or no bleeding at all (? secondary to the hypotensive effect of the general anaesthetic) and hence 'spot' coagulation was not performed. The patients stayed post operatively between 1 to 10 days (mean = 3.3 days). The patients were followed up between 0 to 274 days (mean = 42.7 +/- 168 days, secondary to the patient post FESS follow up).

The surgical treatment failed in three patients, one patient had had SPA diathermy and the other two had had SPA clipping. The failures were all noted to have ongoing epistaxis within the first twenty-four hours post operatively. All patients were bleed free post anterior ethmoidal ligation/diathermy. This was done post embolisation angiography of the internal maxillary artery in one case.

DISCUSSION

This audit sought to define if local practice met accepted published standards. However, there is a lack of high-level evidence on this technique.

There is general consensus that nasal packing should be attempted firstly (post examination and if possible cautery) (Sharp et al., 1997; O'Flynn and Shadaba, 2000; Ram et al., 2000; Srinivasan et al., 2000). However, the morbidity associat-

ed with posterior packing (Montgomery and Reardon, 1980; Fairbanks, 1986), has led some to alter their treatment pathways to offer this surgical option before posterior packs (Wormald et al., 2000). The failure rates quoted/inferred for endoscopic SPA ligation/diathermy in various papers range between 0 to 16% (Sulsenti et al., 1987; Sharp et al., 1997; Snyderman et al., 1999; O'Flynn, 2000; Ram et al., 2000; Srinivasan et al., 2000; Wormald et al., 2000). This compares similarly with 5 to 15% failure rate in transantral ligation of the internal maxillary artery (McDonald and Pearson, 1980; Strong et al., 1995; Metson and Lane, 1998). However, the complications of facial numbness, swelling, teeth desensitisation and oroantral fistula in 25 to 30% would seem to tip the scales slightly in favour of the former procedure. The other popular method of control of severe refractory epistaxis is embolisation of the internal maxillary artery, particularly if there is local radiological expertise. However, reported complications from this procedure include embolisation of the brain with hemiplegia, ophthalmoplegia and blindness. This has been reported to be as high as 27% (Strong et al., 1995; Metson and Lane, 1998). However, this procedure does offer excellent localisation of the offending vessel. In our department, in view of the severity of complications, it was held in reserve to be used if SPA ligation was unsuccessful.

Against this, our audit found a failure rate of 33% for SPA ligation/diathermy. The reasons for this can only be surmised, as the audit above does not contain enough data for conclusions to be made with any degree of statistical certainty. It may be that it is part of a learning curve, as surgeons (2 consultants and a registrar) got to grips with the relatively new procedure. Indeed the result of the survey by the authors of the only other audit shows that more registrars were doing this than their senior consultant colleagues (Srinivasan et al., 2000). This will be born out with time.

The authors wish to point out two other factors for discussion. Firstly all three failures required anterior ethmoidal artery ligation. This resulted in these elderly patients being subjected to a second general anaesthetic. Interestingly, it was noted in the past that improved control of epistaxis occurred when anterior ethmoid occlusion was performed with internal maxillary ligation (Singh, 1992). This is due to the often-indeterminate site of epistaxis despite endoscopic exam (Snyderman et al., 1999). The authors feel that combining the two arterial ligations certainly, by ligating the most prominent distal vessels, to the anterior and posterior nose, would reduce the number of theatre returns. This is also the view of Snyderman et al. in the biggest series of SPA ligations reported thus far (Snyderman et al., 1999).

Metson and Lane, in their work on analysing 100 failures of internal maxillary artery ligation showed that the variable branching pattern of the internal maxillary artery frequently meant it was difficult to find the vessel, and that may be the case again with regards to the sphenopalatine artery. However,

they also found that in 13% of cases that failed, the clips were not correctly closed. In the one case that went on to have embolization, this same phenomenon was observed in vivo (Figure 1). The authors suggest that it may be prudent to ligate the anterior ethmoidal at the same time, and certainly before any of the more invasive procedures are carried out, such as embolisation.



Figure 1. Angiogram pre embolization of the internal maxillary artery showing blood flow, two occluded clips on the sphenopalatine artery.

Thus the authors aim to try to improve on their performance and hope to further investigate this potentially logical way of treating previously intractable epistaxis.

REFERENCES

1. Fairbanks DNF (1986) Complications of nasal packing. *Otolaryngol Head Neck Surg* 94: 412-415.
2. McDonald TJ, Pearson BW (1980) Follow up on maxillary artery ligation for epistaxis. *Arch Otolaryngol Head Neck Surg* 106: 635-638.
3. Metson R and Lane R (1988) Internal maxillary artery ligation for epistaxis: an analysis of failures. *Laryngoscope* 98: 760-764.
4. Montgomery WW, Reardon EJ (1980) Early vessel ligation for control of severe epistaxis. In: Snow JB, ed. *Controversy in Otolaryngology*. Philadelphia: WB Saunders, p 315-319.
5. O'Flynn PE, Shadaba A (2000) Management of posterior epistaxis by endoscopic clipping of the sphenopalatine artery. *Clin Otolaryngol* 25: 374-377.
6. Prades J (1976) Abord endonasal de la fossa pterygo-maxillaire. In: LXIII Congress France. *Compte Rendus des Séances* p 290-296.
7. Pritikin JB, Calderalli DD, Panke WR (1998) Endoscopic ligation of the internal maxillary artery for intractable posterior epistaxis. *Ann Otol Rhinol Laryngol* 107: 85-91.
8. Ram B, White PS, Saleh HA, Odutoye T, Cain A (2000) Endoscopic endonasal ligation of the sphenopalatine artery. *Rhinology* 38: 147-149.
9. Shaheen OH (1975) Arterial epistaxis. *J Laryngol Otol* 89: 17-34.
10. Shaheen OH (1987) Epistaxis in the middle aged and elderly. Thesis, London: University of London.
11. Sharp HR, Rowe Jones JM, Biring GS, Mackay IS (1997) Endoscopic ligation or diathermy of the sphenopalatine artery in persistent epistaxis. *J Laryngol Otol* 111: 1047-1050.
12. Singh B (1992) Combined internal maxillary and anterior ethmoidal artery occlusion: The treatment of choice in intractable epistaxis. *J Laryngol Otol* 106: 507-510.
13. Small M, Maran AGD (1984) Epistaxis and arterial ligation. *J Laryngol Otol* 98: 281-284.
14. Snyderman CH, Goldman SA, Carrau RL, Ferguson BJ, Grandis JR (1999) Endoscopic sphenopalatine artery ligation is an effective method of treatment for posterior epistaxis. *Am J Rhinol* 13: 137-140.
15. Srinivasan V, Sherman IW, O'Sullivan G (2000) Surgical management of intractable epistaxis: audit of results. *J Otolaryngol* 114: 697-700.
16. Strong EB, Bell DA, Johnson LP, Jacobs JM (1995) Intractable epistaxis: transantral ligation vs. embolization - efficacy and cost analysis. *Otolaryngol Head Neck Surg* 113: 674-678.
17. White PS (1996) Endoscopic ligation of the sphenopalatine artery (ELSA): a preliminary description. *J Laryngol Otol* 110: 27-30.
18. Wormald PJ, Wee DTH, van Hasselt CA (2000) Endoscopic ligation of the sphenopalatine artery for refractory posterior epistaxis. *Am J Rhinol* 14: 261-264.
19. Wurman LH, Sack JG, Flannery Jr JV, Paulson TO (1988) Selective endoscopic electrocautery for posterior epistaxis. *Laryngoscope* 98: 1348-1349.

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