

MODIFIED SPHENOPALATINE ARTERY LIGATION TECHNIQUE INCLUDING CAUTERY OF THE POSTERIOR SEPTAL ARTERY

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Abstract

Background: Sphenopalatine artery (SPA) ligation represents a viable option for treating recurrent epistaxis. However, different approaches to SPA ligation and simultaneous procedures performed to increase success rates are often not reported or analyzed in the literature.

Objectives: To describe a modified technique of SPA ligation with proximal clipping of the SPA alone versus concomitant sphenoidotomy with ligation and cauterization of the posterior septal artery (PSA) along the sphenoid rostrum.

Study Design: Retrospective chart review at a large academic center in a municipal city.

Subjects and Methods: A single-center, retrospective chart review from June 2015 – August 2020 of patients undergoing SPA ligation was performed. Baseline demographic data, previous medical management, comorbidities, risk factors, and anticoagulation status were collected on all 195 patients. Basic descriptive statistics and One-Way Anova via SPSS 26 were used for data analysis via SPSS 26. Significant and near significant findings were analyzed using multivariate analysis.

Results: 195 patients underwent SPA ligation procedures, with 184 patients (94%) also undergoing a sphenoidotomy and cauterization of the PSA along the sphenoid rostrum. Of the 184 patients, 24 re-bleed within 30 days (13%). Of the 11 patients that didn't undergo sphenoidotomy and cauterization, 8 re-bleed (73%). Performing a sphenoidotomy and ligation and cauterization of the PSA during SPA ligation was found to be nearly statistically significant in preventing long term complications ($p=0.051$).

Conclusions: Cauterization of the PSA along the sphenoid rostrum may decrease the episodes of recurrent epistaxis following SPA ligation.

Introduction

Endoscopic SPA ligation was first described in 1992 by Budrovich and Saetti¹. During the procedure, the SPA is identified exiting the sphenopalatine foramen (SPF), just posterior to the crista ethmoidalis. However, the arterial configuration within the pterygopalatine fossa, and of the SPA itself, is highly variable (Figure 1). In a cadaveric study of 128 tissue blocks, Chiu et al. found that the internal maxillary artery (IMAX) bifurcates before reaching the SPF in 89% of cases, splitting off into two (69%), three (19%) or four branches (2%)². Simmen documented that there may even be up to 10 arterial branches⁴. Implementing surgical techniques to address this variable anatomy is important for successful control of epistaxis.

One technique implemented in this series to account for the diverse branching patterns of the distal IMAX was to remove a portion of the posterior maxillary sinus wall to clip the SPA proximal to the foramen. This was performed in order to clip the SPA before it branched into multiple arteries more distally. Another technique, cauterization of the sphenoid rostrum and PSA, has been described before as a method to help ensure cessation of bleeding, but in a very small number of patients undergoing concurrent SPA ligation³⁻⁴. With cauterization of the sphenoid rostrum and PSA (Figure 2) performed alongside proximal SPA ligation, we believe that more complete and effective control of posterior epistaxis can be achieved following failed medical management and packing.

Methods and Materials

A single-center, retrospective chart review from June 2015 – August 2020 of patients undergoing SPA ligation, sphenoidotomy and sphenoid rostrum cauterization of the posterior septal branch of the SPA for epistaxis control was performed. Baseline demographic data was collected, along with previous medical management, comorbidities, risk factors, and anticoagulation status. 195 patients were identified and followed for 30 days, with any presentation of epistaxis inside of this period classified as a recurrence. Basic descriptive statistics and One-Way Anova via SPSS 26 were used to generate our results.

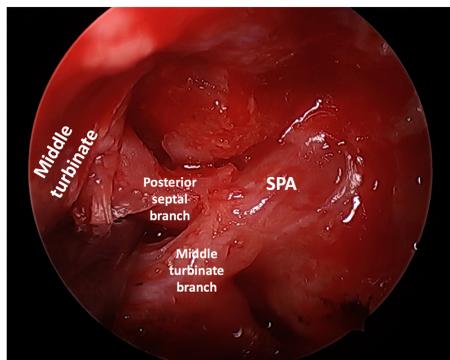


Figure 1. SPA Anatomy Example

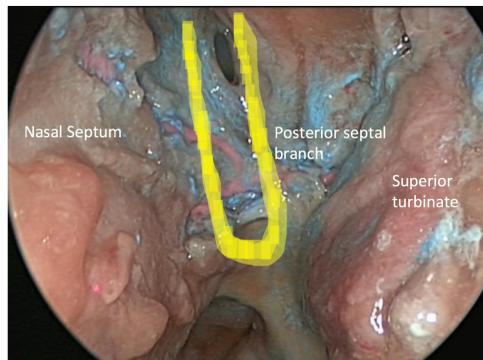


Figure 2. Left Posterior Septal Arteries and Outlined Sphenoidotomy (yellow)

Results

The baseline characteristics of the two groups were comparable in terms of age, sex, and BMI (Table 1). 195 total SPA ligation procedures were performed between June 2015 and August 2020. Of those 195 patients, 184 (94%) also had a sphenoidotomy and their PSA and sphenoid rostrum cauterized (Figure 2). Of the 184 patients, 24 re-bleed (13%). Of the 11 patients that didn't undergo sphenoidotomy and cauterization, 8 re-bleed (73%). Long-term, not performing a sphenoidotomy and cauterization during SPA ligation was found to be nearly statistically significant ($p=0.051$).

Demographics	Total
Male	97
Female	98
Average BMI	28.9
Average Age	60.6

Table 1. Patient Demographics

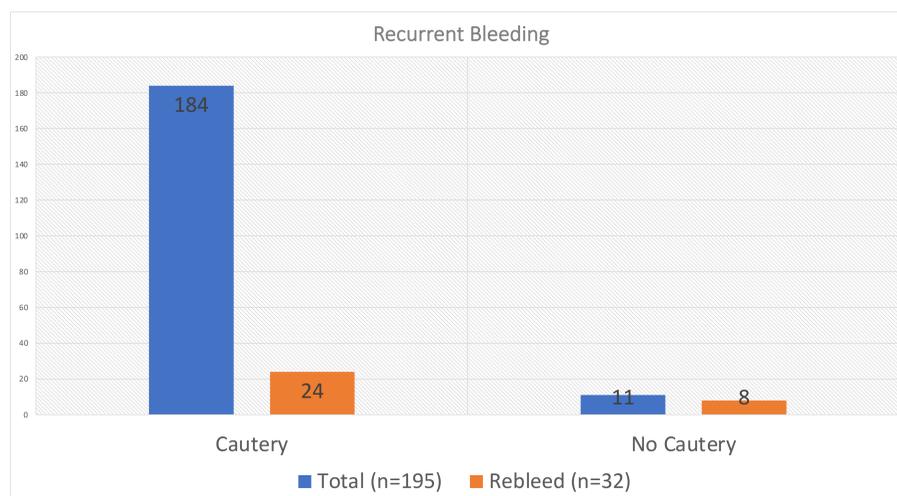


Figure 2. Recurrent Bleeding

Discussion

As described in multiple reports, SPA ligation for control of recurrent posterior epistaxis is an effective and low-morbidity treatment option⁵⁻⁷. Furthermore, when compared to multiple episodes of packing for recurrent epistaxis, SPA ligation is more cost-effective, saving \$437 per patient⁵. SPA ligation decreases length of hospital stay and provides patients with an improved level of comfort relative to multiple packings⁶. Most studies also demonstrate that SPA ligation and embolization are about equivalent in terms of stopping epistaxis, with concerns regarding stroke, blindness, and tissue necrosis following arterial embolization more prevalent⁸. Thus, for cases of recurrent epistaxis following conservative treatment, SPA ligation represents a cost-effective, comfortable, and safe option.

Even with successful ligation of the SPA, however, there is still arterial flow which can contribute to recurrent bleeding. It is the authors experience that frequently after clipping the SPA, when the sphenoidotomy is performed and the posterior septal artery transected, there is arterial bleeding that requires cauterization. Cauterizing the PSA and sphenoid rostrum recognizes this conundrum and is a technique to address it.

Of the 24 patients that experienced re-bleeding following sphenoidotomy, cauterization, and SPA ligation, 4 (25%) then underwent successful anterior ethmoid artery (AEA) ligation. Also, 2 different patients out of the total 24 that experienced recurrent epistaxis subsequently underwent facial artery (FA) embolization, with one also undergoing embolization of the descending palatine artery. These cases highlight the point that recurrent epistaxis is not necessarily a deficiency in the procedure and underscore the challenge to identify the arterial source. The SPA may only represent the etiology of "posterior" epistaxis in 80% of cases¹. These 6 patients then would not necessarily be considered "failures" following SPA ligation, thus increasing the success rate of SPA ligation in this study from 87% to 90%. Continued drug use, digital manipulation, use of anticoagulants, and/or bleeding diatheses may also have contributed to additional refractory bleeding.

Conclusions

Of those 195 patients that underwent SPA ligation, 184 had a sphenoidotomy, ligation and cauterization of the PSA, of which 24 re-bleed (13%). 11 patients did not undergo sphenoidotomy and cauterization, and of those 8 re-bleed (73%). Given the variable anatomy of the SPA and its branches, we found that division and cauterization of the septal branch of the SPA on the sphenoid rostrum may lead to better outcomes and a relative decrease in the total number of re-bleeds following SPA ligation.

Contact

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