Histopathological differences between polyvinyl alcohol and ethylene vinyl alcohol copolymer in pre-operatively embolized glomus jugulare paragangliomas

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INTRODUCTION

Embolorization prior to resection of glomus jugulare tumors has become the standard of care in most institutions. Many different embolic materials have been used, including polyvinyl alcohol (PVA), microcoils, N-butyl cyanoacrylate (NBCA), gelfoam, ethanol, and detachable silicone balloons. Ethylene vinyl alcohol copolymer (EVAC) is a liquid embolic material which has slower precipitation properties, allowing more time to re-approach the tumor vasculature. Injection of EVAC may be interrupted several times for assessment of embolization pattern and early recognition of dangerous intracranial anastomoses. An advantage of EVAC over particulate embolics is that it does not require contrast to determine extent of tumor embolization and does not dissipate over time allowing revascularization.1 PVA occluded only 30% of vessels (range 5-80%) in a previous study by Pauw et al.2 The objectives of this study are:

1) To histopathologically characterize glomus jugulare paragangliomas pre-operatively embolized EVAC
2) To describe histopathological differences between glomus jugulare paragangliomas pre-operatively embolized with PVA and EVAC

METHODS AND MATERIALS

This is a cohort study of glomus jugulare paragangliomas pre-operatively embolized with EVAC and subsequently resected at a tertiary care center between 2003 and 2010. The percentage of tumor devascularization was then determined by tracing the pre-and post-embolization tumor blushes using ImageJ software. Patient demographic and clinical data was collected, and histopathological analysis of the pre-operatively embolized tumors was performed by the same pathologist. Histopathological analyses were also compared to those of PVA done by Pauw et al.2

RESULTS

Six patients were included in the study, ages 16-66. Percent tumor devascularization ranged from 88.54% to 100% (mean 94.98%). Time between EVAC and resection ranged from 1 day to 2.5 months. Surgical EBL was 150-1000cc (mean 600cc). EVAC has a higher cost per milliliter than PVA.

Glomus jugulare paragangliomas embolized with EVAC demonstrated 100% or near 100% occlusion of arterial vessels in most sections by histopathological analysis, indicating that EVAC is an effective embolic agent. However, in a small percentage of cases, there was partial revascularization. In one patient whose tumor was not completely resected after embolization with EVAC, there was no evidence of subsequent growth of the remnant disease, but in another incompletely embolized patient, there was a recurrence of disease.

During surgery, it was noted that in one patient there seemed to be extensive inflammatory reaction and loss of tissue planes, making the dissection significantly more difficult.

CONCLUSION

In our study, histopathological analysis of pre-operatively embolized glomus jugulare paragangliomas indicates that EVAC may provide a more thorough and longer lasting embolic profile than PVA due to its resistance to revascularization of embolized vessels.

REFERENCES