Percutaneous embolization of head and neck paragangliomas with Onyx

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ABSTRACT

Objectives: Endovascular therapy has become an important tool in the management of various head and neck tumors. Percutaneous embolization can be used to reduce intraoperative blood loss, facilitate resection, and avoid the need for additional surgical interventions. Successful tumor devascularization becomes common practice. While traditional transarterial embolization is effective, it also brings with it the risk of neurovascular complications related to the embolization procedures. Therefore, several alternative techniques have been described. The present study aims to evaluate the safety and efficacy of percutaneous embolization for the treatment of head and neck paragangliomas.

Methods and Materials: A total of 12 patients (11 males and 1 female; age range 28 – 70 years) underwent percutaneous embolization via direct tumoral puncture. Tumors included 9 CBM and 3 vagal paragangliomas. The mean fluoroscopy time, volume of Onyx used, percent of tumor devascularization, and the amount of surgical blood loss were evaluated. The percentage of tumor devascularization was then determined by tracing the pre- and post-embolization tumor blushes using ImageJ software (version 1.41f NIH, MD). The fluoroscopy time, volume of Onyx used, and percent of tumor devascularization and the amount of surgical blood loss were determined by linear regression analysis.

Results: Of the 12 patients underwent percutaneous embolization, 10 presented with direct puncture of the tumor. Tumors included 9 CBM and 3 vagal paragangliomas. The mean fluoroscopy time, volume of Onyx used, percent of tumor devascularization, and the amount of surgical blood loss were 64.2 ± 35.1 minutes, 3.6 ± 2.5 ml, 94 ± 4%, and 186 ± 203 ml, respectively. There were no post-operative complications related to the procedure. No adverse events were noted in the follow-up period. There were no immediate or delayed periprocedural complications. The fluoroscopy time, volume of Onyx used, percent of tumor devascularization, and the amount of surgical blood loss were evaluated. The mean fluoroscopy time, volume of Onyx used, percent of tumor devascularization, and the amount of surgical blood loss were determined by linear regression analysis.

Conclusions: Percutaneous embolization of carotid body and vagal paragangliomas tumors with Onyx can be performed safely and efficiently, resulting in favorable devascularization and intraprocedural blood loss.

RESULTS

A total of 12 patients (11 males and 6 females; age range 28 – 70 years) underwent preoperative embolization via direct tumoral puncture. Tumors included 9 CBM and 3 vagal paragangliomas. The average volume of Onyx used per case was 8.8 ml. The mean percent of tumor devascularization was 94 ± 4%. Overall intraoperative estimated blood loss was 405 ± 203 ml.

METHODS AND MATERIALS

We prospectively collected all CBM and vagal paraganglioma tumors embolized with Onyx (ethylene vinyl alcohol copolymer) via direct percutaneous tumoral puncture prior to surgical resection utilizing this technique.

INTRODUCTION

Endovascular therapy has become an important tool in the management of various head and neck tumors. Percutaneous embolization can be used to reduce intraoperative blood loss, facilitate resection, and avoid the need for additional surgical interventions. Successful tumor devascularization becomes common practice.

DISCUSSION

The use of Onyx for direct tumor embolization has not been well-documented and is a largely limited to case reports. Onyx, an ethylene vinyl alcohol copolymer, was initially approved by the FDA in 2005 for the treatment of cerebral arteriovenous malformations and intracranial fistulas has fostered interest in its use for tumor embolization. Our series of 12 cases of CBM and vagal paraganglioma tumors were performed at our academic medical center during a 24-month period. The objectives of this study were to evaluate the safety and efficacy of Onyx in the treatment of head and neck tumors.

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REFERENCES

1. Björn Herman, MD, Mohamed Samy Elhammady, MD, Jason Aminsharifi, BA, Mohammad Ali Aziz-Sultan, MD, Donald Weed, MD.
6. Casasco (1-2), there have been several reports of direct intratumoral embolizations most of which have been performed with either n-butyl cyanoacrylate (NBCA) or polyvinyl alcohol (PVA) (4-5).

CONCLUSIONS

Embolization of hypervascular head and neck tumors with Onyx via direct percutaneous tumoral puncture has proven to be beneficial in several cases. Further studies are needed to determine if the improved tumor penetration achieved with direct puncture technique translates into clinical benefits.

Figure 1. A 3-year-old male presented with a right-sided, soft, exophytic right-sided neck mass. MRI demonstrated a soft-tissue lesion and an abnormal enhancement pattern consistent with a CBT. The patient underwent a diagnostic angiogram which demonstrated a solid-tumor mass and an abnormal enhancement pattern consistent with a CBT. The patient underwent a diagnostic angiogram which demonstrated a solid-tumor mass and an abnormal enhancement pattern consistent with a CBT. The patient underwent a diagnostic angiogram which demonstrated a solid-tumor mass and an abnormal enhancement pattern consistent with a CBT. The patient underwent a diagnostic angiogram which demonstrated a solid-tumor mass and an abnormal enhancement pattern consistent with a CBT. The patient underwent a diagnostic angiogram which demonstrated a solid-tumor mass and an abnormal enhancement pattern consistent with a CBT. The patient underwent a diagnostic angiogram which demonstrated a solid-tumor mass and an abnormal enhancement pattern consistent with a CBT. The patient underwent a diagnostic angiogram which demonstrated a solid-tumor mass and an abnormal enhancement pattern consistent with a CBT. The patient underwent a diagnostic angiogram which demonstrated a solid-tumor mass and an abnormal enhancement pattern consistent with a CBT. The patient underwent a diagnostic angiogram which demonstrated a solid-tumor mass and an abnormal enhancement pattern consistent with a CBT.

Figure 2a. Case of Onyx after tumor resection.

Figure 3a and 3b. Resection of a vagal paraganglioma.

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