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### Utility of preoperative three-dimensional volumetric analysis for carotid body tumour resection

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**Objective:** The Shamblin classification is the most accepted method to predict postoperative outcomes during the carotid body tumours (CBT) resection. However, the tumour's volume varies importantly, even for those in the same classification type. The aim of this study is to describe the utility of performing a three-dimensional (3-D) reconstruction of the CBT and its relationship with postoperative outcomes such as surgical time, estimated blood loss (EBL) and hospital stay.

**Methods:** A descriptive study was carried out using the registry of patients who underwent CBT resection between 2006 to 2017 in a single center. Preoperative computed tomography angiography (CTA) to the surgery was reviewed, using the Osirix® Software (Pixmeo, Switzerland), three-dimensional volumetric reconstructions were performed (Figure 1). Demographic and surgical variables were obtained: age, gender, Shamblin classification, EBL, surgical time and hospital stay. The differences between the values of the volumetric analysis of each Shamblin types were analyzed by the one-way ANOVA test. The Pearson test was used to determine the association between volumetric analysis and postoperative outcomes.

**Results:** 57 patients were studied, 91% were women with a mean age of 59 years. Thirteen CBT were Shamblin type I with a mean volume of 7.69 cm<sup>3</sup> (SD 8.27), 21 were type II with a mean volume of 15.57 cm<sup>3</sup> (SD 8.40), and 23 were Type III with a mean volume of 30.58 cm<sup>3</sup> (SD 20.16). The ANOVA test showed significant differences between the volumes of each classification ( $p < 0.0001$ ). Estimated blood loss (EBL) mean was 559 milliliters (mL) (SE 80.44) the mean procedural time of resection was 202 min (SD 67), and mean of hospitalization was 5.8 days (SD 3.23). The Pearson test showed a correlation of  $r=0.6$  between volume and EBL, a  $r= 0.4$  was obtained between CBT volume and intraoperative time, and  $r=0.3$  between volume and hospital stay.

**Conclusions:** The volume of CBT varies among the different types of the Shamblin classification, being more evident in type III tumours. Therefore, a volumetric analysis of CBT is a viable option to obtain predictors of postoperative outcomes during resection of these tumours.

Figure 1:

**Figure 1.** Computed Tomography Angiography with three dimensional reconstructions of Carotid Body Tumor and volumetric measurement

