Klinik und Poliklinik für Mund-, Kiefer- und Gesichtschirurgie
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Management of cystic defects of the lower jaw depending on cyst volume – A retrospective study

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Introduction

Bone cysts are pathological structures that are associated with varying degrees of bone destruction and most commonly occur in the head and neck region. Since the progressive growth of cysts can lead to damage to surrounding tissues as a result of pressure atrophy, resorption or displacement, surgery is the treatment of choice. The most common surgical methods are marsupialisation and enucleation, with the latter being preferred in many cases. As recommended by Partsch, cysts with a diameter of no more than 2 cm should be treated by enucleation and larger cysts should be treated by marsupialisation. On the basis of the assumption that cysts are spherical in shape, the volume of a jaw cyst with a diameter of 2 cm is calculated to be 4.19 cm^3.
The objective of this study was to assess whether this threshold value still plays a role in making decisions about appropriate treatment.

Methods

Cone-beam computed tomography (CBCT) and computed tomography (CT) data were obtained from 88 patients who underwent treatment for a mandibular cyst. The volumes of the mandibular cysts were calculated using iPlan 3.0.2 software. The operative reports of the patients were then reviewed in order to determine the cyst volume above which a bone defect was filled. Each cyst was measured three times. Data were analysed using IBM SPSS Statistics 19 and SAS 9.2. Youden's index was used to obtain an optimum threshold value, which gives the highest sensitivity and specificity. This provides the basis for determining the cut-off value.

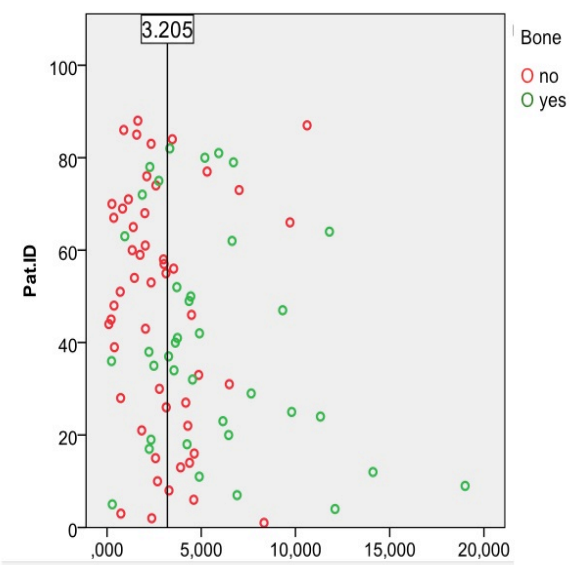

Tabelle
Scatter Plot of the particular volumes

Results

The Youden index was highest at a cut-off of 3.205. At this point, sensitivity was 0.730 and 1-specificity was 0.333. Sensitivity and specificity results thus suggest that autogenous bone grafts were used for the intraoperative reconstruction of defects resulting from the removal of cysts with a minimum volume of 3.21 cm^3. A scatter plot shows the distribution of volumes around the cut-off. Ideally, all red circles, which represent patients who did not undergo defect reconstruction with autogenous bone grafts, should lie to the left of the cut-off at a specificity and sensitivity of 100%. By contrast, all green circles, which represent patients with a cyst volume of more than 3.21 cm^3, should lie to the right of the cut-off. The threshold above which mandibular defects were filled was a cyst volume of 3.21 cm^3 in the patient population investigated in this study.

Discussion

The cut-off that was retrospectively determined in this study was 3.21 cm^3, which corresponds to a sphere with a diameter of 1.83 cm.
The simplified model presented here confirms the recommendation of Partsch that only cysts with a maximum diameter of 2 cm be treated by enucleation. The diameter that was calculated in a computer-assisted manner on the basis of CT and CBCT data (i.e. 1.83 cm) is almost identical to the threshold reported by Partsch.
For this reason, both the historical value suggested by Partsch and the cut-off volume of 3.21 cm^3 calculated using computer software are legitimate and useful tools for basic treatment planning. It is true that the assumption of a cyst as a sphere can only serve as a model. Nevertheless, the study shows that the recommendation of Partsch to only reconstruct defects resulting from cysts with a diameter of 2 cm and more is still appropriate and is still implemented.

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