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Case Report

Intraoperative Use of C-Arm Machine to Evaluate Bone Surgical Margin of Resected Mandible Specimen

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ABSTRACT

Principle of every onco-surgery is to attain tumor free specimen margins. Development of high resolution imaging and navigational systems based on high-resolution computed tomography or magnetic resonance imaging with microscope-based navigation, allows excellent evaluation of surgical margins intra-operatively. However these systems are very expensive and not readily available.
We report use of C-arm machine intra-operatively to screen and evaluate surgical margins of resected mandible specimen of ameloblastoma involving the body of left mandible.

Key-words: C-arm machine, jaw, specimen, margins

INTRODUCTION

To attain disease free specimen margin is of paramount importance in every tumor surgery. Recurrence of a tumor in head and neck region has been demonstrated to be inversely proportional to width of disease free specimen margin. [1] That is, greater the width of disease free borders of the resected specimen lesser the chances of recurrence.

The concept of imaging bone specimens is rather old. However, it has been solely for histopathological studies and educational reasons. [2] Development of high resolution imaging and navigational systems based on the integration of high-resolution computed tomography or magnetic resonance imaging with microscope-based navigation, allows excellent evaluation of surgical margins intra-operatively. [3] However these systems are very expensive and not readily available, with an exception of few highly specialized cranio-facial centers. Due to their limited availability and economic consideration, identification of alternative possibilities using existing technologies with current hospital infrastructures is an appealing and justifiable option.

We report use of C-arm machine intra-operatively to evaluate surgical margins of resected mandible specimen of ameloblastoma involving the body of left mandible. The protocol of the present report has been approved by the ethical review board of the author's institution.

CASE REPORT

36 year old male patient presented with complain of expansile painless swelling of lower jaw. Panaromic imaging of the lesion showed a multilocular radiolucent lesion with defined borders, involving the root apices of left mandibular canine, premolar & 1st molar and extending inferiorly to involve the lower border of mandible (Figure 1). Intra-osseous incision biopsy was done under local anesthesia. Diagnosis of ameloblastoma was made based on histopathology report.

Segmental resection of the mandible was planned and carried out under general anesthesia. Anterior and posterior margins of the resection was kept distal to lateral incisor and mesial to 2nd molar respectively, keeping a safe margin determined by pre-operative clinical and radiological assessment (Figure 2). To examine the margins, the resected specimen was radiographically assessed in the operating room using a C-arm machine. The specimen appeared to have a healthy bone margins all around (Figure 3). However it was felt that width of safe margin at the anterior end was not sufficient and further ostectomy was done in that region. Histopathological evaluation of the excised specimen confirmed diagnosis of ameloblastoma, with disease free mesial and distal bone margins.

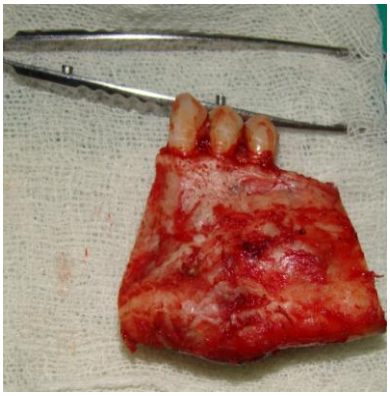

Figure legends:
Figure 1: Pre-operative Orthopantomogram.
Figure 2: Resected specimen.
Figure3: Intra-operative imaging of bone specimen using C-arm machine.

DISCUSSION

C-arm machines are relatively economical and readily available in most of the operating rooms. They are commonly used in intra-operative imaging for orthopedic trauma. C-arm machines are often smaller than traditional imaging units, making them more portable. Use of intensifiers in these machines magnifies readings, thus lowering the amount of X-rays to be used and results in less radiation exposure for patients and professionals.

Although its use in maxillofacial surgery has been previously reported for intra-operative assessment of reduction of zygomatic arch fractures, [4,5] to best of our knowledge its use in intraoperative evaluation of resected mandible specimen is being reported for first time. We found it to be a valuable imaging modality for intraoperative examination of the margins of the resected mandible body specimen. This would provide a simple and economic aid for primary radiographic evaluation of resected jaw tumor margins.

Affordability, Portability, less radiation exposure and easy availability in operating room makes C-arm machine a

useful aid for intra-operative assessment of bone surgical margin of resected mandible specimen.

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