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Role of MDCT in Evaluation of Maxillofacial Trauma

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Abstract

Maxillofacial injuries are one of the most frequently encountered emergencies accounting for a large proportion of patients in emergency department. The complex anatomy of the facial bones requires multiplanar imaging techniques for a proper evaluation. Now-a-days, road traffic accidents and violence are the common reasons which have led to increase in the frequency of maxillofacial injuries. The most common fracture, either isolated or associated with other fractures, was the orbital floor fracture. Due to rapid progression in diagnostic imaging, accuracy of detection of injuries and patients outcome of maxillofacial traumas has dramatically improved. The main purpose of diagnostic imaging is to detect and localize the exact number, site of facial fractures and soft tissue injuries. MDCT offers excellent spatial resolution, which in turn enables exquisite multiplanar reformations, and 3-D reconstructions, allowing enhanced diagnostic accuracy and surgical planning.

Keywords: Maxillofacial fractures; multidetector computed tomography; multiplanar.

Introduction

Maxillofacial injuries are one of the most frequently encountered emergencies accounting for a large proportion of patients in emergency department [1,2]. Now-a-days, road traffic accidents and violence are the common reasons which have led to increase in the frequency of maxillofacial injuries [1,2,3]. Clinically, maxillofacial fracture can be suspected in a patient with trauma for the presence of certain clinical signs, although such signs may be initially concealed by overlying edema, hemorrhage and soft tissue swelling [4]. Due to rapid progression in diagnostic imaging, accuracy of detection of injuries and patients outcome of maxillofacial traumas has dramatically improved. The main purpose of diagnostic imaging is to detect and localize the exact number, site of facial fractures and soft tissue injuries.

Mandibular fractures

CT was more sensitive than panoramic tomography, particularly for fractures of the angle, ramus, or condyle[5]. Condylar fractures have been detected in 64.8% of all patients with mandibular fractures using MDCT [6]. For other studies, 48.0% of patients with mandibular fractures had condylar fractures using radiographic examination [7], and condylar fractures accounted for 50.1% of the

mandibular fractures using panoramic radiography and CT examinations [8]. We consider that prevalence of condylar fractures using MDCT was higher than those of other reports because of the exquisite sensitivity of MDCT.

In this review, mandibular fractures were classified according to the distribution described by Lieger et al. [9] into four types: median, paramedian, angle and condylar types. The most common mandibular fracture site was the condyle (33.6%), followed by the angle (21.7%), and multiple fractures of the mandible were present in 48.6% of patients [10]. Regarding the distribution of mandibular fractures, the majority (25.0%) occurred in the condyle and 23.0% in the angle [11]. The condyle (38.2%) and median (27.0%) were most frequently involved in the mandible[12]. The fracture lines were multiple in 44.4% of all mandibular fracture patients [13]. The condylar type was most common (47.1%), followed by the median type (20.9%), and the percentage of multiple fractures was 50.7% of all mandibular fracture patients [14]. These reports suggest no difference of percentage in mandibular fractures between single and multiple fractures.

Midfacial Fractures Including Maxillary Fractures

There are several types of midfacial fracture, including Le Fort I–III, zygomaticomaxillary complex, and anterior maxillary and others [16-18]. Sohns et al. [15] showed that most of the observed fractures seen in their study were orbital fractures (22%), fractures of the maxilla (21%), nasal bone (14%), and zygomatic bone (9%). Smith et al. [19] indicated that common fractures were orbital (41%), malar and maxillary (28%), and nasal bones (19%). These reports suggest the difference of percentage in midfacial fractures, although most of the observed fractures seen were orbital fractures.

Conclusions

MDCT with MPR and 3D images has become a standard part of the assessment of maxillofacial injury because of the exquisite sensitivity of this imaging technique for fracture. In this review, we summarized the maxillofacial fractures using MDCT, especially mandibular fractures and midfacial fractures including maxillary fractures. Fracture morphology of maxillofacial trauma is often complex, and maxillofacial bones support functions such as breathing, smelling, seeing, speaking, and eating. Therefore, maxillofacial fractures require accurate radiologic diagnosis using MDCT and surgical management to prevent severe functional debilities and cosmetic deformity.

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