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Review Article

MR imaging diagnostic protocol for unilocular lesions of the jaw

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Summary Ameloblastomas and keratocystic odontogenic tumors (KCOT) are typical jawbone tumors. In addition, dentigerous cysts (DC) and radicular cysts are the most common cystic jawbone lesions, and simple bone cysts (SBC) are the most common jawbone pseudocysts.

When these lesions are unilocular, it can be difficult to diagnose them by radiography. In recent years, adding magnetic resonance (MR) imaging to obtain information about soft tissue has been shown to improve the accuracy of jawbone lesion diagnosis. We also have reported MR imaging features of jawbone lesions. However, no systematic method for MR imaging diagnosis of jawbone lesions has been reported.

In this review, we examine unilocular lesions such as ameloblastoma, KCOT, adenomatoid odontogenic tumour (AOT), DC, and SBC. First, we describe the MR imaging features of each lesion. Then, we describe our novel MR imaging diagnostic protocol.

Using our MR imaging diagnostic protocol to diagnose 31 cases, we obtained a positivity rate of 71.0%. The use of our MR imaging diagnostic protocol for unilocular lesions, which are especially difficult to differentiate by radiography, would improve the morphological and qualitative diagnosis of soft tissue lesions.

Contents

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1. Introduction

Ameloblastomas and keratocystic odontogenic tumors (KCOT) are typical jawbone tumors. In addition, dentigerous cysts (DC) and radicular cysts are the most common cystic jawbone lesions, and simple bone cysts (SBC) are the most common jawbone pseudocysts. Jaw lesions are histologically classified into odontogenic lesions and non-odontogenic lesions and are diverse in nature [1,2]. In the diagnostic imaging of lesions, conventional radiography is performed to observe changes in hard tissue. Radiographs can show the size of a lesion; its shape, such as whether it is multilocular or unilocular; impacted teeth; root resorption; and calcific substances. These jawbone lesion findings are really useful and important. However, the radiographic features of multilocular ameloblastomas and KCOT are very similar [3]. Furthermore, these lesions can sometimes appear to be unilocular. Thus, it can be difficult to differentiate these lesions from other unilocular lesions such as DC and adenomatoid odontogenic tumour (AOT) [4—6].

In recent years, the use of magnetic resonance (MR) imaging to obtain information about the soft tissue has improved the accuracy of diagnosis. MR imaging has also been used to diagnose lesions in the oral and maxillofacial regions [7—10]. The superior soft tissue contrast of MR imaging makes it the most useful modality for analyzing the internal structures of a lesion. We have also reported the MR imaging features of jawbone lesions [11—19]. However, no systematic method for MR imaging diagnosis of entire jawbone lesions has been reported.

In this review, we examine unilocular lesions that are difficult to diagnose. This study chose lesions with a higher incidence such as ameloblastoma, KCOT, AOT, DC, and SBC. First, we describe the MR imaging features of each lesion. Then, we explain the MR imaging diagnostic protocol that we have developed.

2. Materials and methods

2.1. Patient population

We retrospectively examined 31 cases (19 males and 12 females; age range, 7—80 years; mean, 32.5 ± 18.6 years) of primary unilocular jawbone lesions in which MR imaging was performed after the initial radiographic imaging diagnosis between 1997 and 2008. Plain MR imaging was performed in all patients, and 26 patients underwent contrast enhanced (CE) MR imaging. In addition, dynamic CE (DCE) MR images were also acquired in 24 of these cases. After the MR imaging, 29 cases were histopathologically diagnosed during surgery. Two cases of SBC were diagnosed clinically. The lesions included 7 cases of DC, 8 ameloblastomas, 10 KCOT, 2 AOT, and 4 SBC. Table 1 shows a summary of the cases.

2.2. MR imaging study protocol

2.2.1. MRI study protocol

The MR examination was performed using a 1.5-T unit (Magnetom Vision; Siemens, Erlangen, Germany) with a head—neck coil. Routine T1 weighted images (WI) were acquired with a spin-echo sequence using the following parameters: repetition time (TR): 500—660 ms and echo time (TE): 15 ms, and T2WI or short inversion time inversion-recovery (STIR) images were acquired with a turbo-spin-echo sequence using the following parameters: (TR/TE): 2800—3000/90—105 ms for T2WI and 4500, 6100/60/140 ms (TR/TE/TI) for STIR images.

Table 1 Summary of the cases.

	Plain MRI			Total
	Alone	CE-MRI		
		Alone	DCE-MRI	
Ameloblastoma	0	1	7	8
KCOT	1	1	8	10
DC	4	0	3	7
AOT	0	0	2	2
SBC	0	0	4	4
Total	5	2	24	31