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Decompression of large cystic lesions of the jaw: a case series

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Abstract

Aim: To present a series of clinical cases of large odontogenic cysts of the jaw treated with surgical decompression and insertion of a drainage stent.
Materials and methods: Fourteen patients with jaw cysts of odontogenic origin were followed up from time of presentation until there was clinical and radiographic resolution of the cystic lesion. The cysts were all treated with surgical decompression and insertion of a stent.
Results: In all cases, there was radiographic evidence of bony infill and complete resolution of the radiolucent area. In those cysts associated with an unerupted tooth, there was also evidence of spontaneous eruption. None of the patients suffered any serious post-operative consequences.
Conclusions: Decompression is a viable alternative to more aggressive techniques in the management of large cysts of the jaw. There is minimal post-operative morbidity, and the technique may reduce the need for general anaesthesia.

Clinical relevance

Surgical decompression of large odontogenic cysts is a conservative technique that enables the conversion of a large lesion into a smaller one, thus reducing surgical morbidity. It also gives surgeons the opportunity to obtain a histopathological diagnosis prior to embarking on definitive treatment.

Introduction

The most common type of odontogenic cyst is the radicular cyst, followed by the dentigerous cyst and keratocystic odontogenic tumour. Cysts are often asymptomatic and are frequently discovered incidentally, or when inflammation or infection develops[1,2]. As cysts enlarge, they resorb bone and expand into the surrounding tissues (e.g. the maxillary sinus), and may also displace neighbouring teeth[3]. The surrounding structures may, therefore, suffer some damage before the cystic lesion is identified and managed appropriately[3].

Several surgical approaches exist for the management of larger cysts of the jaws[4]. These include enucleation, marsupialisation and decompression. Decompression involves the creation of a small window/fenestration in the cystic wall. This allows the lining of the cyst lumen to become confluent with that of the oral cavity. The insertion of a decompression stent/drainage tube is required so that continuity between the cystic lumen and the oral cavity is maintained[5,6]. Such continuity establishes free draining of cystic contents and equalisation of the intra- and extracystic pressures[7].

The aim of this article is to highlight the successful technique of surgical decompression. Surgical decompression is a conservative technique when compared with enucleation, and its usefulness is highlighted here in a case series of patients. The advantages and disadvantages of this approach will be discussed and illustrated by clinical cases.

Materials and method

Eleven male and three female patients with cysts of odontogenic origin were treated by decompression in the Combined Department of Oral and Maxillofacial Surgery and Oral Medicine at the Edinburgh Dental Institute site, UK (see Table 1). Patient age ranged from 13 to 78 years. Eight of the cysts were located in the

Table 1 Description of clinical cases

M/F	Age†	Cyst type	Location	Size: W × H*	Local anaesthetic (LA)/General anaesthetic (GA)	Stent use‡	Complications			Outcomes		
							Stent discomfort	Stent repositioned	Infection	Follow–up§	Bony infill	Required 2nd intervention
M	13	Radicular	Left maxilla	35 × 35	LA	11				52	X	
F	19	Radicular	Right mandible	40 × 30	GA	17				61	X	
M	33	Keratocystic odontogenic tumour	Right mandible	68 × 28	GA	32		X		Current	X	Curettage
M	34	Radicular	Right maxilla	58 × 27	LA	42	X			108	X	
M	36	Radicular	Left maxilla	33 × 21	LA	5	X			78	X	
M	38	Radicular	Right maxilla	31 × 31	LA	9				61	X	
F	45	Radicular	Maxilla: midline	22 × 22	LA	7				78	X	
M	47	Radicular	Right maxilla	74 × 22	LA	11	X	X		104	X	
M	50	Dentigerous	Left mandible	24 × 19	LA	12				29	X	Extraction 38 and enucleation
M	60	Likely dentigerous	Right maxilla	39 × 29	LA	22	X			57	X	Extraction 18 and enucleation
M	61	Residual	Right mandible	19 × 22	LA	3	X			16	X	Enucleation
F	63	Dentigerous	Left mandible	22 × 50	LA	2	X		X	26	X	
M	78	Dentigerous	Right maxilla	48 × 32	LA	17	X		X	52	X	
M	78	Dentigerous	Left mandible	51 × 29	LA	6	X			36	X	

*Size in millimetres.

†Age in years.

‡Stent use in weeks.

§Follow-up in weeks from stent insertion until discharge/2nd intervention.

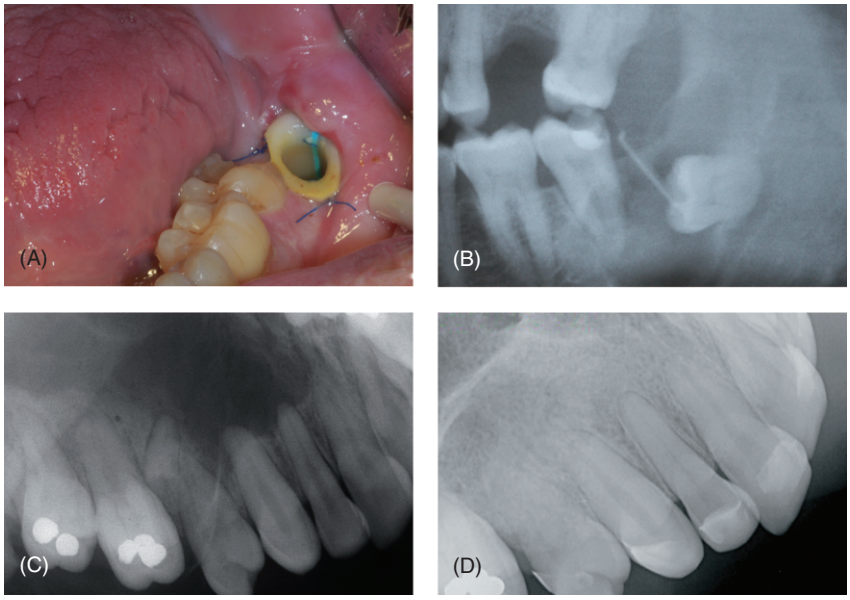

Figure 1 (A) Decompression stent: clinical photograph of stent in situ in lower left mandible held in place with non-resorbable sutures. (B) Orthopantomograph with decompression stent in situ. Radiopaque band of stent is also very clear and helps monitor stent position. (C) Preoperative radiograph showing large radicular cyst in right palate associated with retained root 15. (D) Post-operative radiograph showing complete resolution of the radiolucent area in the right palate following cystic decompression.

maxilla and six in the mandible. Eleven patients were treated under local anaesthetic, one with the addition of conscious intravenous sedation and two under general anaesthesia.

The sizes of the cysts, measured as diameter on available radiographs (orthopantomograph or maxillary occlusal radiograph in one case), varied from 21 mm to 74 mm. Nine patients presented with swelling and pain, one of which was associated with a history of altered sensation. Four cysts were asymptomatic. One patient was seen following referral from the Clinical Genetic Service regarding a recent diagnosis of Gorlin–Goltz syndrome. For each of the patients, a thorough history was recorded, and appropriate radiographs were taken.

In the case series that follows, we have used a custom-made device made from a modified portion of thoracic catheter of 5 mm diameter. Both ends of the tubing were given a lip to prevent the stent from being displaced into or out of the cystic cavity. The length of the tube was chosen to correspond with the distance between the wall of the cyst and the oral mucosa. The thoracic catheter has a radiopaque marker, which is considered important to monitor stent position and for patient safety (Fig. 1B).

A fenestration was created surgically in the most prominent area of the cystic wall, and a specimen from the cystic wall was obtained for histopathological analysis in all of the cases. The custom-made surgical stent was sutured into place with non-resorbable sutures to maintain patency of the opening between cystic and oral cavities (Fig. 1A).

Following the initial surgical procedure, patients were reviewed weekly for irrigation of the cavity with saline. After a few weeks, patients were supplied with a syringe to irrigate the cavity at home, and were reviewed at intervals for a period of between 2 and 25 months after insertion of the stent.

The majority of dentigerous cysts in this series were treated with decompression alone. The radicular cysts were treated with a combination of decompression and adjuvant extraction/endodontic treatment of the non-vital tooth. In four of the cases (including the keratocystic odontogenic tumour), a second surgical procedure was required to enucleate the remaining cystic lining. This second intervention was carried out under local anaesthetic. All cases were followed up until complete resolution of the cyst was noted both clinically and radiographically.

Results

Complete resolution was noted in those cysts that were treated with simple surgical decompression (Fig. 1C and D). Resolution was also observed in those cases that required a second intervention to enucleate the reduced size cyst. In all cases, a post-operative radiograph confirmed cavity shrinkage and bony infill. In those dentigerous cysts associated with an unerupted tooth, there was also evidence of spontaneous eruption/movement of the tooth. These radiographic signs were noted as early as 2 months post-operatively in the younger members of the series. In those cysts

that involved the maxillary antrum, there was evidence of repneumatisation/re-expansion of the antrum.

At the point of discharge, all cysts had been completely externalised/involuted to leave an intact mucosa, sometimes with a small mucosa-lined cul-de-sac. Those cases in which impacted/unerupted teeth were left in situ remained asymptomatic and have been kept under long-term review in case of recurrence.

Discussion

There is no uniformally agreed treatment of large odontogenic cysts[4]. Several surgical approaches exist for the management of odontogenic cysts of the jaws.

Enucleation comprises the complete removal of the cyst lining. This is usually a definitive treatment and requires no further surgical intervention. During this technique, developing tooth buds associated with dentigerous cysts are removed together with the lining and are consequently lost[3]. In addition, if large cysts are treated in this way, the risk of morbidity is higher as nearby teeth and vital structures may be damaged[4].

Marsupialisation is the conversion of a cyst into a pouch[8]. The cystic roof is removed in its entirety, and the cut edges of the remaining cyst wall are sutured to the adjacent soft tissue[9]. In this way, the cystic lining is made continuous with the lining of the oral cavity, maxillary sinus or nasal cavity[8].

Surgical decompression could be considered a minimally invasive technique that enables the conversion of a large lesion into a smaller, more contained one, which can be managed surgically with less associated morbidity. The authors would consider that marsupialisation and surgical decompression are based on the same principle, with the main difference being the size of the opening made in the cyst lining.

Fenestration and decompression also provide a sample of the cystic wall that can be subjected to histopathological examination so that a definitive diagnosis is established before embarking on a more aggressive treatment such as enucleation or resection[10]. Incisional biopsy is required because dentigerous cysts, keratocystic odontogenic tumours, unilocular ameloblastomas, and other odontogenic and non-odontogenic tumours may have a similar radiographic appearance. Decompression may be inappropriate for some of these lesions, which require more aggressive treatment[11]. The choice is based on the histopathology, the size of the cyst and its proximity to adjacent structures. Incisional biopsy is not possible in enucleation, and if lab facilities for frozen section are unavailable on site, the diagnosis is only confirmed after surgery[10]. Only a small section of the cystic lining is taken for histopathological analysis. This means that some pathologies may be misdiagnosed[10]; for example, a unicystic ameloblastoma may be confused with a simple radicular cyst.

Decompression has also been used to treat keratocystic odontogenic tumours, which are known for their aggressive behaviour and tendency to recur[12]. Recent studies have shown that following decompression, there can be metaplastic change of the epithelial lining of the keratocystic odontogenic tumour, making it less aggressive[13,14]. The resultant thicker epithelium makes subsequent enucleation of keratocysts more straightforward[8]. Some authors report complete resolution of such cysts with simple decompression[8,13,15]. Pogrel[16], however, found that there was a recurrence rate as high as 12% in cases treated solely with decompression, and advised subsequent enucleation and curettage in keratocystic odontogenic tumours. In the Gorlin–Goltz case presented in this series, we felt it prudent to curettage the remaining cystic cavity following decompression.

We noted relatively rapid bony infill of the cystic cavities following insertion of the surgical stent. There was radiographic evidence of this as early as 2 months post-operatively. Bony infill and reduction in cystic size was noted radiographically in all 14 cases, and only four cases required further surgical intervention for enucleation and curettage of the remaining cyst. In the dentigerous cysts, we noted spontaneous migration of the unerupted tooth towards the crest of the alveolar ridge and away from vital structures, such as the inferior alveolar canal and maxillary antrum. We feel it is justifiable to leave asymptomatic unerupted/impacted teeth in situ: surgical procedures for extraction may be associated with significant morbidity including pain and swelling together with the possibility of nerve injury[17]. This risk is more significant in deeply impacted teeth.

Treatment is generally well tolerated by patients, with the major drawback being the requirement for repeated follow-up. Case selection is important for this technique to be successful[9]. Time and patient compliance are important factors for the success of surgical decompression. The technique demands patient cooperation and requires close observation[3], and therefore several review appointments, to monitor shrinkage of the cyst. We found that several patients complained of discomfort/ulceration when the drainage stent was in situ. Repositioning of the stent was required in some cases to improve patient comfort.

In this series, decompression was used to treat both extremes of age. The elderly may be fragile and may be suffering from significant systemic disease, but this

technique may eliminate the need for treatment under general anaesthetic. It is also of value when managing cysts in children[4,18], including radicular cysts of primary teeth[19], as it does not disturb continued growth of bones and preserves developing teeth. There is no associated cosmetic, functional or psychological morbidity associated[11,18]. In the case of dentigerous cysts, decompression may permit normal eruption of the retained tooth if root formation is incomplete[11].

Conclusion

Cystic decompression is a conservative approach in the management of large cystic lesions that may significantly reduce the associated morbidity and costs. The technique is limited by the need for patient compliance and repeated post-operative review, and occasional need for secondary surgical intervention.

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