Technical note

Use of methylene blue for precise peripheral ostectomy of keratocystic odontogenic tumour

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Keratocystic odontogenic tumours are relatively common. In 2005 they were reclassified and renamed keratocystic odontogenic tumours in the WHO classification of head and neck tumours. Because they are aggressive and have a high potential for recurrence, complete resection is vital. Causes of recurrence are incomplete removal of the cystic lining and growth from small satellite cysts or odontogenic epithelial nests left behind after resection. 1, 2 Although their treatment remains controversial, conservative or aggressive treatment is selected according to size and location of the tumour, degree of involvement of the soft tissues, and history of previous treatment. Their recurrence depends on the treatment: enucleation has a high recurrence rate because the complete removal of the thin epithelial lining and daughter cysts is difficult, whereas resection is less likely to result in recurrence though this can be highly invasive. Less aggressive treatment should therefore be selected for benign tumours.

Adjunctive measures (mechanical curettage, chemical curettage, or cryosurgery) and enucleation also have important roles in reducing the incidence of recurrence and invasion. Given the high recurrence rate, however, if there is any doubt about the adequacy of complete removal of all neoplastic tissue, additional peripheral ostectomy is strongly recommended. 3 Incomplete removal after peripheral ostectomy seems to result from technical difficulty when surgeons cannot identify accurately the amount of bone that has been removed. To overcome this problem, we describe the use of methylene blue for precise peripheral ostectomy.

After the tumour has been enucleated, the surface of the bone cavity is dyed with a 1% solution of methylene blue (Fig. 1). The bone stains heavily and peripheral ostectomy

Fig. 1. Dyeing the surface of the bone cavity after enucleation of the keratocystic odontogenic tumour using a 1% solution of methylene blue.
is possible that will remove any residual peripheral neoplastic tissue. Precise and complete removal of the dyed area is possible using a rotary bar or ultrasonic bone device (Fig. 2).

Methylene blue is of low toxicity and has recently been proposed for intraoperative detection of canal isthmuses in molars during endoscopic periradicular surgery, and early detection of oral cancer and precancerous lesions. The exact mechanism of its uptake in epithelial cells is not clear, but it may penetrate into cells that have an abnormal increase in nucleic acid. Efficient dyeing with methylene blue enables easy identification of areas that have been incompletely excised during peripheral ostectomy. Such an approach is helpful, as not even skilled surgeons can identify precisely when sufficient bone has been removed using conventional methods. We also often use methylene blue to ensue complete removal of ameloblastomas, which also have a high incidence of recurrence.

Although we have used this method since 2007 and no tumour has recurred, further follow-up is necessary.

Conflict of interest

None.

References