

Resection of palatal tumours with the CO₂ laser

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Abstract

On the basis of the authors' experience with 20 patients, CO₂ laser resection of palatal tumours has proved to be a good alternative to conventional surgical resection. The CO₂ laser beam permits precise resection, due to only slight intra-operative bleeding coupled with use of the operating microscope. Wound healing is good and post-operative pain remarkably little.

Introduction

The CO₂ laser beam has acquired increasing importance in recent years as a surgical cutting instrument in various specialist fields of medicine. It is particularly suited to operations on the upper respiratory and digestive tracts because its energy output is confined to the surface and unaffected by pigmentation, and because it can consequently be well controlled (Grossenbacher, 1979, 1985). As early as the end of the 1970's, the advantages of CO₂ laser surgery were recognized for the treatment of localized tumours of the tongue and floor of the mouth, since it facilitated precise resection with minimal intra-operative bleeding, slight post operative oedema and pain, and good preservation of function (Strong *et al.*, 1979, Rhys Evans and Frame, 1988).

More recently, we have also employed the CO₂ laser beam increasingly for tumours of the hard and soft palate, and report our experience below.

Materials and methods

During the period from May 1985 to December 1988, a total of 21 laser surgical procedures were performed on 20 patients with palatal tumours at the Department of Oto-Rhino-Laryngology, Head and Neck Surgery, Cantonal Hospital, St Gallen. The treated cases were retrospectively analysed with regard to age, sex, histology, tumour localization, complications, healing period and recurrence rate.

The apparatus employed is a CO₂ laser system (Cooper, model 250Z) coupled with an operating microscope (Zeiss OP Mi 1) (Fig. 1). For easily accessible palatal tumours, it is also suitable for direct incision using the handpiece, with which the microscope is also employed. The smallest possible focus (0.8 mm diameter) is used for continuous working with a power output between 10 and 20 watts. Most operations take place under general anaesthesia with nasotracheal intubation. After exposing the operative field (Fig. 2a) with

McIvor's tonsillar spatula, the nasotracheal tube and all exposed skin and mucosal sites are covered with moist towels to protect from stray radiation. For protection of the cornea, the operation room personnel wear protective spectacles.

The line of incision is first marked with the CO₂ laser

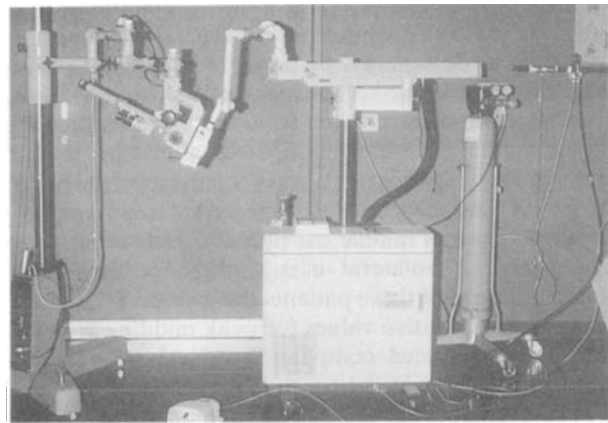
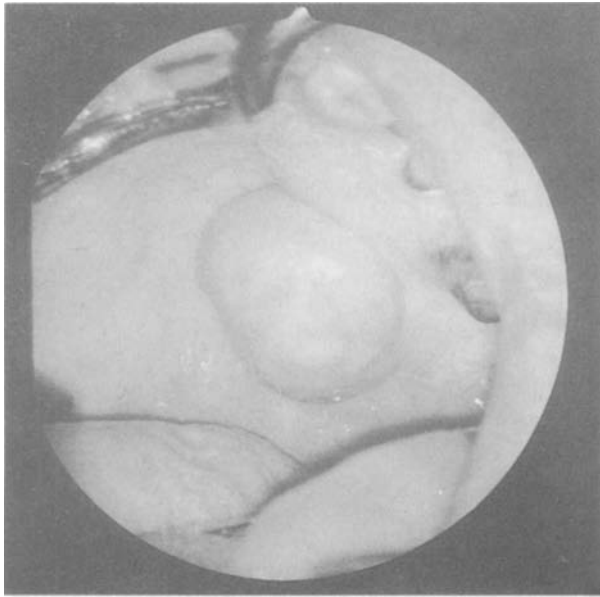


FIG. 1

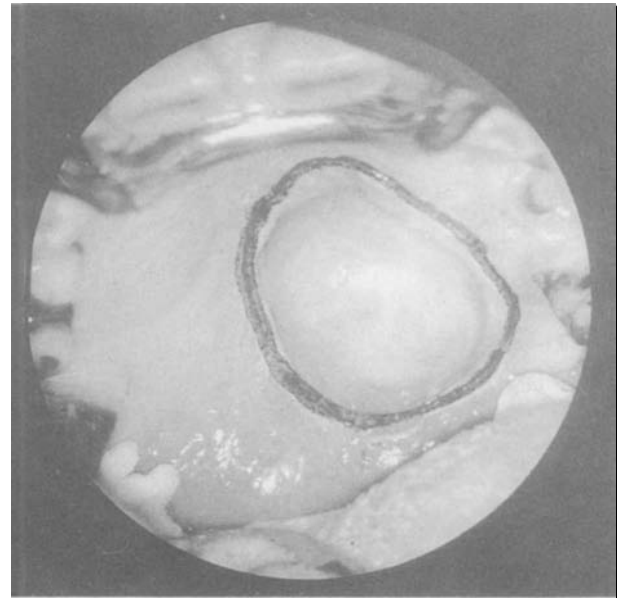
The CO₂ laser system employed, with operating microscope attached.

beam 5–10 mm peripheral to the microscopically-visible tumour boundary (Fig. 2b). The margin of the tumour specimen is now grasped at one point with a clamp and, under continuous tension, the tumour can be cut around step by step in healthy tissue, working with the CO₂ laser beam in the gaping incisional fissure. The tissue structures can be readily differentiated because of the virtual absence of bleeding. Larger vessels with a diameter over 0.5 mm must occasionally be coagulated with bipolar forceps. The periosteum of the hard palate is left intact if this permits sufficiently radical excision. The wound surface is left uncovered to heal by secondary granulation

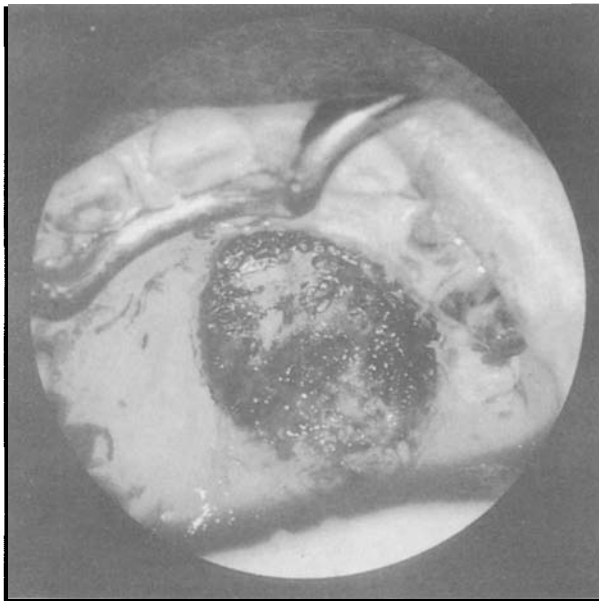
Accepted for publication: 4 October 1989.



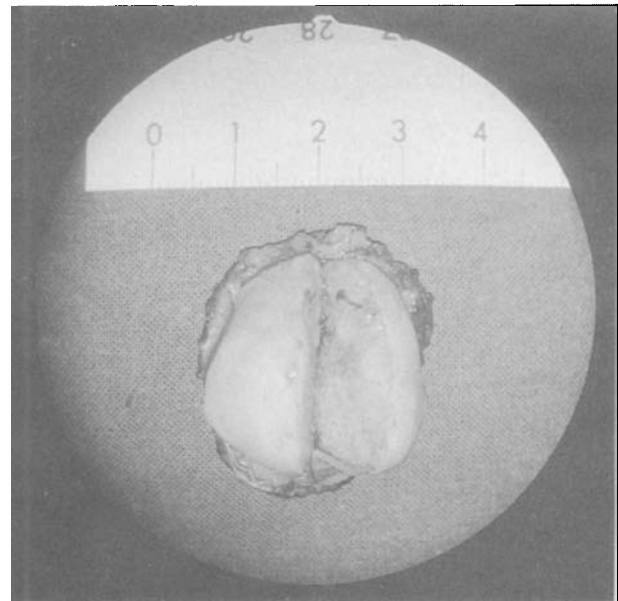
a. Operation site defined.



b. Incision line marked with CO₂ laser beam.



c. Wound surface after tumour removal by CO₂ laser surgery.



d. Resected tumour with typical cut surface.

FIG. 2a-d
Resection of a pleomorphic adenoma.

and epithelization (Fig. 2c). The pathologist can assess the cut edges of the resected tumour without difficulty, as with the conventional procedure (Fig. 2d).

Results

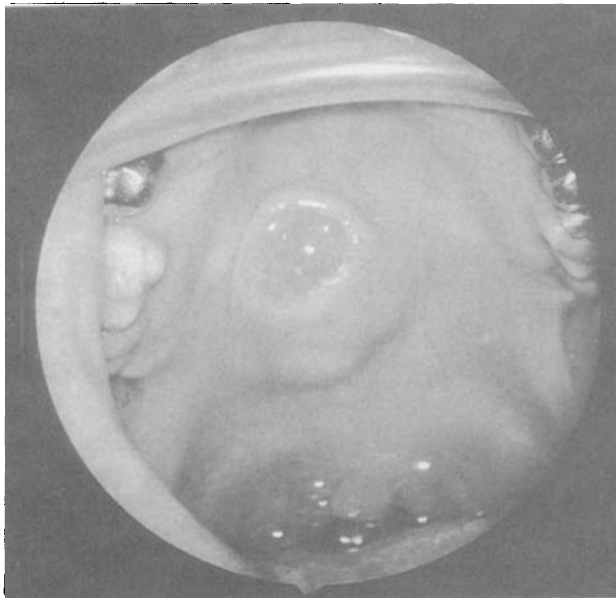
With the technique described above, a total of 21 laser surgery operations on the palate were performed on 20 patients. The 12 female and eight male patients were aged between 16 and 78. The distribution of the histological morphology of the treated lesions is shown in Table 1. Among the 12 benign tumours most commonly represented are pleomorphic adenomata, and among the eight malignant tumours squamous cell carcinomata. In all, seven tumours can be traced by their fine structure to the small salivary glands. One-third of the tumours were

localized on the hard palate, one-third on the soft palate and one-third in the transitional zone.

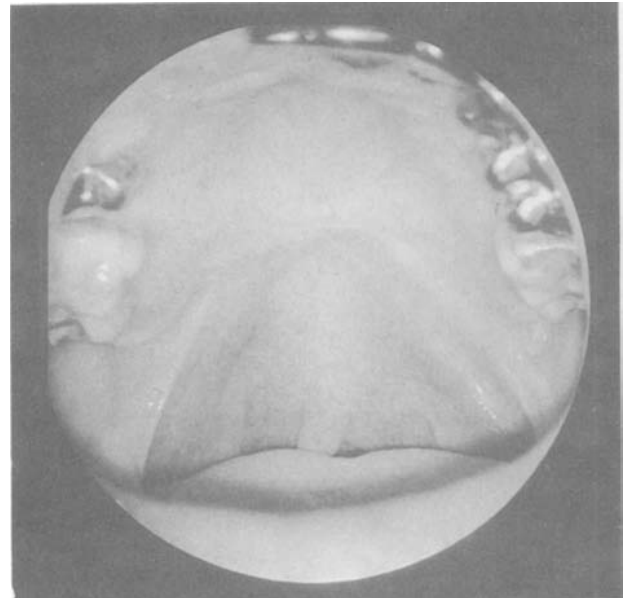
A further example is presented to illustrate the method described (Fig. 3a-c).

TABLE I
HISTOLOGY OF THE 20 PALATAL TUMOURS

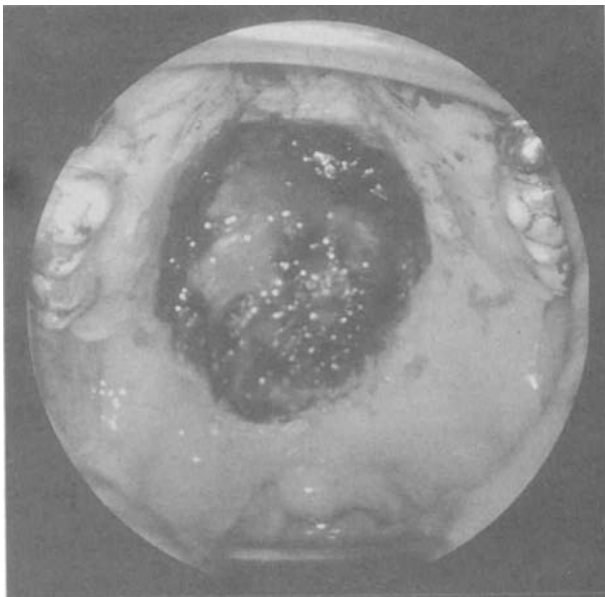
Squamous cell carcinoma	5
Pleomorphic adenoma	4
Squamous cell papilloma	2
Acantho-hyperkeratosis	2
Haemangioma	2
Monomorphic adenoma	1
Mucoepidermoid tumour	1
Adenoidcystic carcinoma	1
Malignant mesenchymal tumour	1
Fibroma	1



a



c



b



FIG. 3a-c

Monomorphic adenoma of palate:

a. Superficially ulcerated tumour of palate, before operation.

b. Large resected area, over 4 cm in diameter, with exposed bone.

c. Condition one year post-operatively.

After resection of a large, superficially ulcerated monomorphic adenoma from a 35-year-old woman, the wound measured over 4 cm in diameter, with exposure of bone. Even this resection defect healed without problems within 2½ months.

A striking feature was the slight post-operative pain even among patients with such extensive resections. Neither wound infection nor post-operative bleeding was observed. According to the size of the defect, complete epithelialization took between three weeks and 2½ months. Exposed bone, in particular, delayed granulation formation but, astonishingly, this caused the patients scarcely any discomfort. In two patients the operation produced a small perforation in the soft palate, which however closed spontaneously within a short time. Two further patients with extensive resections of the soft palate for squamous cell carcinomata

had post-operative problems with eating because of velo-pharyngeal deficiency, which could be improved with an obturator prosthesis. During the follow-up period between five months and four years, one of the 20 patients developed a tumour recurrence, and two cases treated palliatively had persistent tumours.

Discussion

In the light of our experience, CO₂ laser surgery appears to be as valuable for palatal tumours as repeatedly reported for other sites in the oral cavity (Duncavage and Ossoff, 1986; Flynn *et al.*, 1988; Grossenbacher, 1985; Guerry *et al.*, 1986; Nagorsky and Sessions, 1987; Rhys Evans and Frame, 1988). The main advantage of the method is the excellent visualization due to only slight intraoperative bleeding, especially when using the

operating microscope. With the relatively common salivary gland tumours, primary radical resection without injuring the tumour capsule is known to be particularly important. In comparison to electrosurgical resection, the significantly smaller depth of damage at the margin of the incision with CO₂ laser-surgical resection leads to better wound healing and improved histological assessment of the cut edge (Duncavage and Ossoff, 1986; Guerry *et al.*, 1986). Even larger defects with exposed bone healed without problems in all our cases with minimal post-operative complaints. The method described does not consist of uncontrolled tumour vaporization, but tumour resection with consistent histological assessment of the cut edge. In no case should the employment of the CO₂ laser for treating malignancy lead to neglect the generally recognized oncological principles of tumour resection. The uncontrolled vaporization of malignant tumours performed elsewhere should, in our view, be decisively rejected. Among squamous cell carcinomata, only tumours with minimal deep spread and no lymph-node metastases are suitable for curative therapy. For palliation, the CO₂ laser can occasionally be employed in incurable conditions for tumour resection. Whether local recurrence, or with malignant tumours metastasis formation, occurs less commonly after CO₂ laser-surgical resection are speculative questions that need to be settled by large controlled studies.

Conclusion

CO₂ laser-surgery for palatal tumours offers a good alternative in comparison to conventional resection with

the scalpel or electrotome. The main advantage of the method is that it facilitates precise resection with optimal visibility. Striking features are minimal post-operative complaints with good wound healing.

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