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Laser Surgery for Small Perianal Neoplasms

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Excisional laser surgery was used to treat 62 patients suffering from perianal, perineal, and anal canal neoplasms. 48 patients had benign epithelial or pigmented tumours, 12 had carcinoma *in situ* and 2 had invasive squamous cell carcinoma. Laser surgery was performed under local anaesthesia, in association with the operating microscope on an outpatient basis. 59 out of 62 patients (95%) had clear margins of resection after primary laser surgery, and 3 patients required a second excision for uncleared margins. 3 patients of the group of carcinoma *in situ* recurred, and 2 had new disease in an untreated area. These patients underwent re-section with the same technique. No significant local complications were observed for single or multiple operations at the perianal and anal canal level. All patients are disease-free in a follow-up ranging from 4 to 113 months, with a median of 25 months. Laser excisional surgery appears to be a suitable method for treating superficial tumours.
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INTRODUCTION

IDEAL MANAGEMENT for surface lesions of the perineal, perianal and anal canal area should satisfy the following requirements: accurate intraoperative diagnostic information, easy execution, low morbidity, preservation of anatomy and function, successful long-term results. A variety of alternative treatment modalities have been reported recently for perianal neoplasms [1–7]. Sharp knife resection for the removal of surface lesions of the perineal and perianal areas is hampered by the high vascularisation, such that intraoperative bleeding prevents the precise assessment of the lesion margins. Destructive treatment modalities, such as cautery, cryosurgery or topical chemotherapeutic agents, do not allow complete examination of the lesion.

In order to verify the technical and clinical effectiveness of the laser surgical tool, we developed a unified approach to the treatment of perianal lesions, by performing laser excisional procedures.

MATERIALS AND METHODS

Instrumentation

Three CO_2 surgical lasers were used: Valfivre L SS 25, Coherent 450 and Cooper 250 Z Models. Output power reached 25–35 W, continuous wave; the various irradiances used were related to the spot diameters of the beam (0.5–2 mm). The operating microscopes, Zeiss OPMI-1 and OPMI-6H (magnification power ranging from 2 to 24X) were coupled with the articulated arm of the laser instrument. The focal length of the focusing lens was 300 mm.

The excisional method was used to obtain the entire surgical specimen for pathological examination [8]. By using the laser beam as a surgical scalpel, adequate incisions were obtained by deepening the sulcus of incision at higher irradiances (region of 1.500–10.000 W/cm^2). CO_2 laser was used at a mean output of 20 W, continuous wave, with 1 mm mean spot diameter. Important adjunctive instruments were the suction apparatus for the fumes and microcalipers.

Study population

From August 1981 to November 1991, in the day hospital of the Division of Diagnostic Oncology and the outpatient clinic a total of 62 patients underwent excisional laser surgery for perineal, perianal and anal canal lesions. The distribution of the 62 patients according to histology, sex and age is shown in Table 1. Fifty-four of the 62 neoplasms were located in the perineal and perianal skin, seven were confined to the anal canal and one involved both the anatomic sites. The size of the neoplasms ranged from 0.4 to 2.3 cm of maximum linear extent, with a median value of 0.9 cm (Table 2). Mechanical bowel preparation was carried out before surgery only for anal canal involvement. Mean depth of laser resection was 2 mm. After the laser resection the wound bed was left to heal by second intention with sutures (Fig. 1).

Neither preoperative nor postoperative antimicrobial pro-

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Table 1. Distribution according to histology, sex and age of 62 cases

Histology	No. of cases	Sex Male	Female	Age (years) Median	Range
Benign	48	16	32	42	10–75
Fibroepithelial papilloma	32	14	18		
Nevic lesions	11	2	9		
Hydroadenoma	3	—	3		
Seborrheic keratosis	1	—	1		
Myoblastoma	1	—	1		
Carcinoma *in situ*					
Bowen	11	1	10	42	31–78
Paget	1	—	1	44	
ISCC	2	—	2		55–86

ISCC = invasive squamous cell carcinoma.

phylaxes were used in any cases. Postoperative care included stool softener (Planten, Serono), local douches with antiseptics (Betadine solution) and anaesthetic gel (Luan, Molteni). Usually defecation occurred the second postoperative day and caused no problems. The first clinical examination was usually carried out 1 month after surgery and follow-up was every 4 months for the first year and every 6 months thereafter.

RESULTS

All the 48 benign lesions were completely removed after primary laser excision and patients are disease-free in a follow-up period ranging from 4 to 113 months (median 25 months).

Histological examination of the surgical specimen of the intraepithelial and invasive tumours showed cleared resection margins in 11 out of 14 cases. Of the 3 uncleared resections, the first two (Bowen's disease and Paget disease) had a second laser resection and are disease-free 14 and 4 months after the second surgery. The third uncleared case was an invasive squamous cell carcinoma (ISCC) resected for reductive surgery in an elderly patient (86 years old). This patient died 3 months after surgery. The second ISCC was an unexpected diagnosis after the pre-operative histological report of intraepithelial neoplasia grade III plus human papillomavirus (HPV) infection. This patient had clear resection margins. The final histological diagnosis was ISCC. The patient had no further treatment and is disease-free 9 months after laser resection. Of the 10 clear resection cases of Bowen's disease (classified as intraepithelial neoplasia grade III associated with HPV infection), 5 are disease-free in a follow-up period ranging from 4 to 48 months (median 18 months), 3 had recurrences, and 2 had new occurrence of intraepithelial neoplasia in the untreated perianal area. The recurrences were observed after 18, 5 and 6 months, respectively. All these recurrent cases underwent laser re-resections (two in the first patient, one in the second, and four in the third) and they are disease-free 7, 77 and 6 months after the last surgery. The two new occurrences were observed 4 and 5 months after primary laser resection. A new resection was performed for the removal of the disease in all the abovementioned patients and they are disease-free 6 and 25 months after the second surgery (Table 3).

Significant intraoperative bleeding occurred in 1 patient, which required ligation of the right external haemorrhoidal vein. No other significant postoperative complications were observed. Cosmetic results were satisfactory in all cases, without scarring or functional impairment.

DISCUSSION

The anal margin, embryologically derived from the ectoderm, is lined by both true and modified skin. The transition of modified skin to true skin, which is continuous over the perianal region is located between the lower and the middle third of the anal canal. The presence of benign tumours of the stratified skin or intraepithelial neoplasia (AIN) frequently located at the transitional zone [9] can be managed effectively by excising the superficial layers without removing the underlying tissue, muscle or nerve supply, with no interference to faecal continence.

Laser surgery has been used extensively with excellent results and minimal complications in the genital and perianal area [10, 11]. Benign tumours, Bowen's and Paget disease in the perianal area may be treated by CO_2 laser microsurgical resection under microscopic guidance. The precision of the micromanipulation of the CO_2 beam allows for accuracy in delineating the margins of resection and exact control over the depth of the resection up to the lower third of the anal canal. This is likely to reduce failures in recognising the precise extension and can result in a decreasing rate of persistent disease. This technique provides for intraoperative control of the anatomical landmarks and a surgical specimen for histological examination. Also, the histological information of the unclearance of the resection margins provides indication for further treatment.

Particular advantage is recognised in conserving normal tissue at the lesion margins in a virtually bloodless field.

The minimal perilesional tissue damage during laser surgery led to good healing of the wound, and to the absence of postoperative morbidity and infectious complications, thus allowing satisfactory cosmetic results without disfigurement and functional impairment.

Table 2. Distribution according to site, size and treatment procedures

Histology	No. of cases	Anatomic site Skin	Mucosa	Skin–mucosa	Maximum linear extent Median	Range	Laser surgery Resection	Resection and lateral vaporisation
Benign	48	42	6		0.9	0.4–2.3	48	—
In situ	12	10	1	1	0.8	0.5–1.8	9	3
Malignant	2	2	—		1.0	0.8–1.2	2	—
Total	62	54	7	1	0.9	0.4–2.3	59	3

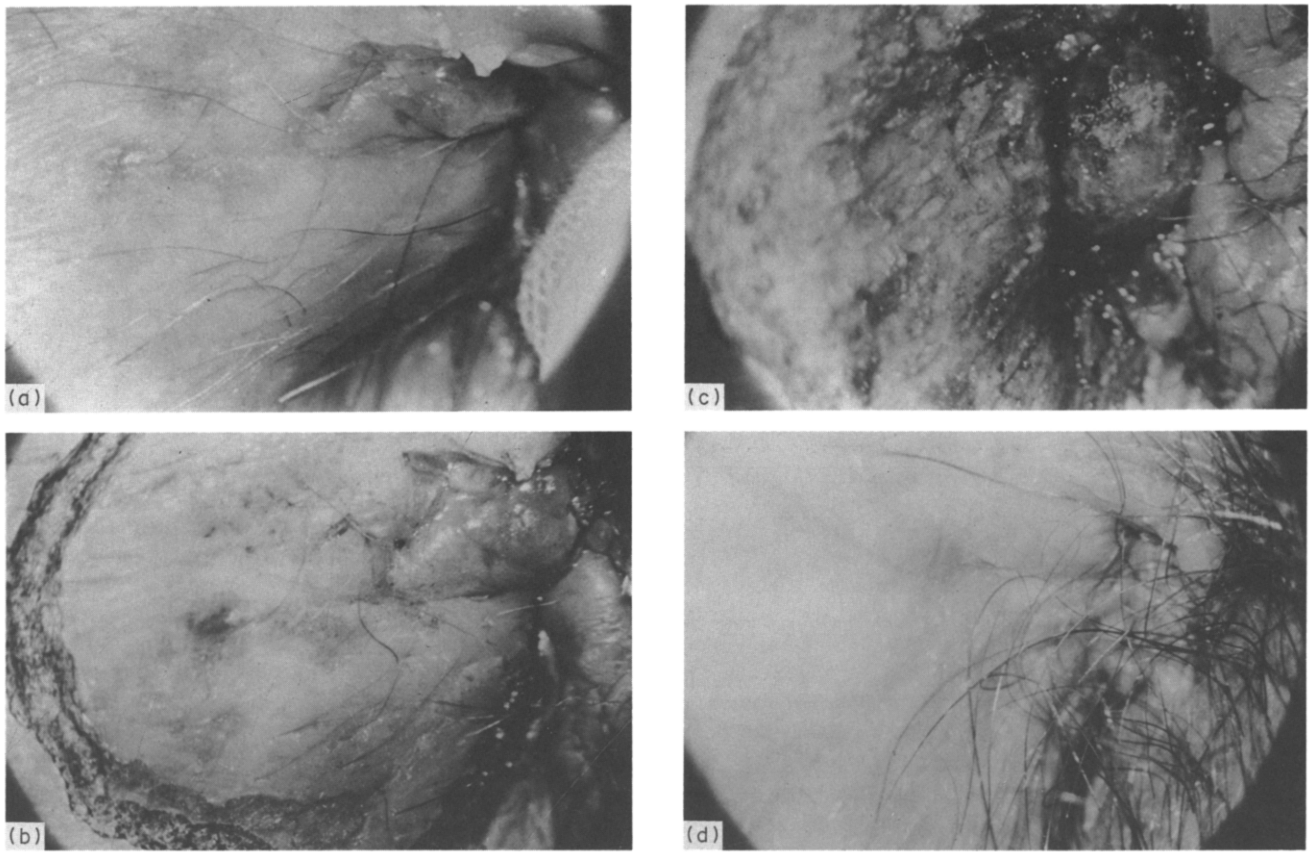

Fig. 1. Patient with carcinoma *in situ* of the right perianal area. (a) Aspect of the lesion before surgery. Under colposcopic examination, multiple reddish and aceto-white areas are observed, with involvement of the anal margin and associated with microflorid condylomatous lesions. (b) Under local anaesthesia, the lesion is outlined with a 2-mm deep perimetral sulcus before the laser microsurgical resection. (c) Immediately after resection of the superficial lesion. Real-time haemostasis with CO_2 laser was satisfactory during the entire resection with the exception of the ligation of an external haemorrhoidal vein at the anal margin. The wound is left to heal by second intention. (d) Aspect of the perianal region 2 months after laser excision of the tumour. Healing with re-epithelialisation occurred without scars or local complications. Anatomical and functional results were satisfactory.

In our series, multiple resections were performed only for patients with local recurrences or new occurrences of Bowen's disease. It is known that local excision does not remove all skin prone to develop new disease, thus neither wide, nor simple excision prevents recurrence of Bowen's disease, which occurs in 10–20% of cases [12–16]. In our opinion a conservative surgical approach is a preferable choice with respect to a wide excision, without skin grafting. Laser excision is the treatment of choice when feasible, i.e. when the areas of disease are small and can be completely excised by a simple operation. However, the treatment of recurrent disease with repeated traditional surgical excision subjects the patient to the risk of local complications. Laser surgery, because of the minimal superficial scarring, rarely damages the deeper tissue, and this can be safely repeated in case of recurrence of new occurrence of the disease in the perianal area. This limited tissue injury does not cause stricture formation or dysfunction of the anal sphincter.

Finally, laser perianal surgery can be safely performed on an outpatient basis thus reducing the impact of neoplastic disease on patients with favourable balance of costs and benefits.

Table 3. *Results of the treatment*

		Clear margins					Unclear margins	
Histology	No. of cases	No. of cases	NED	Median follow-up (months)	Recurrence (months)	New occurrences (months)	No. of cases	Outcome (months)
Benign	48	48	48	25	—	—		
Bowen's	11	10	5	18	3 (18, 5, 6)	2 (4, 5)	1	NED (14)
Paget	1	—	—	—	—		1	NED (4)
ISCC	2	1	1	9	—		1	Lost (3)
Total	62	59	54	25	3	2	3	

NED = no evidence of disease.

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Importance of the Irradiation Timing Within a Chemoradiotherapy Sequence Including Cisplatin and 5-FU-Folinic acid. Experimental Results

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The objective of the present *in vitro* study was to determine an optimal timing of the irradiation in the combination cisplatin (CDDP) and 5-fluorouracil–folinic-acid (5-FU–FA) allowing a maximal cytotoxic effect on a human cell line derived from a head and neck carcinoma (CAL 27 cells). The various tested chemoradiotherapy sequences were applied in parallel to human keratinocytes in culture (SVK 14 cells). This was done in order to define the best sequence allowing the achievement of an optimal selectivity of the cytotoxic effects. The drug sequence was: CDDP over 2 h then fresh medium was added including the tandem 5-FU–d,l FA applied 6 h after CDDP, for 5 days. Irradiation was applied only once and at various times within the drug sequence. The cytotoxicity effects of the different chemoradiotherapy combinations were assessed by the MTT semi-automated test. The part taken by the 5-FU–FA combinations in the overall cytotoxicity was examined; an effect was apparent on CAL 27 cells only. The evolution of the radiation effect (RE = cell survival after drugs/cell survival after drugs plus irradiation) was analysed as a function of the different times of irradiation within the given drug sequence. Clearly, the RE values were dependent upon time at which the radiation dose in the chemoradiotherapy regimen was administered. For CAL 27 cells, irradiation effects were maximal at the first irradiation time tested after the end of the CDDP exposure (i.e. t = 3.5 h). In contrast, this optimal chemoradiotherapy timing for better cytotoxicity on CAL 27 cells did not correspond to that of SVK 14 cells. Consequently, it was possible to establish that the best time for the selectivity index was located shortly after the CDDP exposure.
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INTRODUCTION

THE MAIN objective of concomitant chemoradiotherapy is to increase complete remission and cure rate of solid tumours [1]. An additional purpose is to reduce treatment morbidity and to increase quality of life by decreasing the incidence of standard surgical procedures, the aggressiveness of surgery, or the total radiotherapy/chemotherapy dose delivered. These objectives apply quite well to head and neck cancer where concomitant chemoradiotherapy can find a large area of application. Chemotherapy, as judged by its current optimal results obtained with the 5-fluorouracil (5-FU)–cisplatin association, reaches 80% of objective response; however complete responses represent only half of the response rate [2–4]. Due to positive interactions which have been demonstrated between 5-FU and radiotherapy