

Analysis of early complications in patients with locoregional recurrences of head and neck carcinoma after combined surgery and HDR brachytherapy treatment – a preliminary report

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Introduction. Local or nodal recurrences after primary combined treatment of advanced head and neck cancer (H&N) pose as a very difficult clinical problem; almost 50% of these patients do not fulfil the criteria for salvage surgery or any other radical treatment. Patient groups are heterogeneous – they differ as to primary treatment and tumour localization, while the lack of detailed information concerning locoregional advancement, surgical margin status and descriptions of surgical procedures further complicate the issue. In view of these facts, the best choice for salvage treatment seems to be surgery, followed by interstitial brachytherapy.

Aim. To evaluate the tolerance of treatment in patients with local and nodal H&N recurrence treated with salvage surgery and interstitial HDR brachytherapy.

Material and method. We evaluated 15 patients with recurrent local or locoregional H&N squamous cell cancer, primarily treated with surgery and radiotherapy in other institutions treated at the Maria Skłodowska-Curie Memorial Cancer Center and Institute of Oncology in Gliwice between January 2001 and April 2003. In the entire group the intended secondary treatment was radical surgery, with implantation of catheters into the tumour bed. The pathological status of surgical margins in salvage surgery was negative in 8 patients, close in 4 cases and positive in 3 cases. HDR brachytherapy was started 2 days after surgery: 10 patients received 2 fractions per day to a total dose of 32-36 Gy and 5 patients – one daily fraction of 5 Gy to a total dose of 20 Gy. The total treatment time ranged from 4 to 6 days, depending on the schedule.

Results. Partial necrosis of the rotational flap and the free flap was observed in 2 patients. The pectoral muscle flap was used in 6 cases – for the reconstruction of the floor of the mouth, the tongue, the lower lip and the pharynx. In these cases we observed no problems with healing. Minor complications in wound healing were observed in 3 patients: 2 required repeated surgery due to impaired wound healing. Altogether, healing complications were observed in 46.6% of patients, 33.3% of whom required surgery and 13.3% repeated reconstructive surgery. We did not observe acute radiation toxicity, nor any problems with the removal of catheters.

Conclusions. HDR brachytherapy as adjuvant therapy after surgery is a safe method in the treatment of recurrent H&N cancer associated with an acceptable rate of complications.

Ocena wczesnych powikłań u chorych z nawrotami miejscowymi i węzłowymi w regionie głowy i szyi po leczeniu chirurgicznym skojarzonym z brachyterapią HDR – doniesienie wstępne

Wstęp. Zaawansowane wznovy miejscowe lub węzłowe nowotworów złośliwych regionu głowy i szyi stanowią szczególnie trudny problem kliniczny, a około 50% pacjentów z nawrotem nowotworu nie kwalifikuje się do leczenia ratującego. Uwzględniając te czynniki oraz sekwencję wcześniej przeprowadzonego leczenia celowym wydaje się kojarzenie chirurgii z brachyterapią w leczeniu ratującym tychże chorych.

Cel. Celem pracy jest ocena tolerancji leczenia skojarzonego chirurgii ratującej, z brachyterapią HDR, u chorych z nawrotami miejscowymi i węzłowymi w regionie głowy i szyi.

Materiał. Materiał stanowi grupa 15 chorych leczonych w Centrum Onkologii Oddział w Gliwicach w okresie od stycznia 2001 r. do kwietnia 2003 r. z powodu nawrotu miejscowego bądź węzłowego raka płaskonabłonkowego regionu głowy i szyi, uprzednio leczonych poza Centrum Onkologii chirurgicznie i napromienianiem (brachyterapia HDR w sekwencji

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okołooperacyjnej). Wszystkich chorych operowano z intencją radykalną i ewentualną rekonstrukcją, implantując jednocześnie dreny w lożę pooperacyjną oraz obszar oceniony celem przeprowadzenia okołooperacyjnej brachyterapii HDR. W trakcie chirurgii ratującej uzyskany margines resektowanej wznowy oceniono histopatologicznie jako radykalny u 8 chorych, jako wąski u 4 i jako nieradykalny u 3. U 10 chorych dawki frakcyjne podawane były 2 razy dziennie do dawki całkowitej 32-36 Gy, a u pięciu chorych zastosowano frakcjonowanie 1 raz dziennie (Df 5 Gy) do dawki całkowitej 20 Gy. Całkowity czas brachyterapii wynosił od 4 do 6 dni.

Wyniki. Ratujące leczenie chirurgiczne z okołooperacyjną brachyterapią HDR było dobrze tolerowane przez chorych. Powikłania gojenia ran pooperacyjnych wystąpiły u 46,6% chorych, z czego 33,3% wymagały następowych interwencji chirurgicznych, a u dwóch (13,3%) ponownego zabiegu odtwórczego.

Wnioski. Zastosowanie brachyterapii HDR jako uzupełnienia leczenia operacyjnego u chorych na zaawansowanego raka regionu głowy i szyi ze wznową miejscową jest postępowaniem bezpiecznym, niezwiększającym ryzyka wczesnych powikłań, a odsetek powikłań jest akceptowalny w grupie chorych z niekorzystnym rokowaniem.

Key words: head and neck cancer, salvage surgery, HDR brachytherapy

Słowa kluczowe: nowotwory regionu głowy i szyi, chirurgia ratująca, brachyterapia HDR

Introduction

Local and nodal recurrences of advanced head and neck cancers after primary combined treatment (H&N) continue to be a very difficult clinical problem. Approx. 50% of patients are disqualified from further radical treatment and have very poor prognosis [1, 2], while attempts at secondary treatment create many difficulties. Achieving negative surgical margins during salvage therapy is a real challenge [3].

The group of patients with recurrent H&N cancer is highly heterogeneous because of different primary treatment (surgical procedures and radiotherapy schedules) and different tumour localization. The lack of detailed information concerning locoregional advancement, the status of surgical margins and the details of the surgical procedure causes further problems. It seems important to match different therapeutic methods while local recurrence can be the only symptom of treatment failure. When considering all these factors, the best choice seems to be surgery, followed by interstitial brachytherapy. According to a majority of publications complications in wound healing are reported in 36-50% of patients [4-6] and they could be the main limitations of such a combined treatment.

Aim of study

The aim of this study was to evaluate treatment tolerance in patients with local and nodal H&N recurrences treated with salvage surgery and interstitial HDR brachytherapy.

Material and method

We evaluated a group of 15 patients with recurrent local or locoregional H&N squamous cell cancer, who were treated at the MSCMCC in Gliwice between January 2001 and April 2003. All patients were primarily treated with surgery and radiotherapy outside our institution and admitted to the MSCMCC with histopathologically confirmed failure at the primary site and/or the cervical lymph nodes. Detailed information concerning the surgical margins and previous therapy was missing in 10 patients. Brachytherapy was included in salvage treatment planning

because of poor locoregional prognosis and the lack of data concerning histological dates of first surgical treatment. Microscopically negative margins obtained during salvage surgery are considered unreliable and insufficient to withdraw postoperative brachytherapy. Brachytherapy was used as a means to decrease the risk of another failure.

In case of the entire group secondary treatment was of radical intent, with tissue reconstruction performed when necessary and with implantation of catheters in the postresective tumour bed (Figures 1, 2). All catheters were implanted in a previously irradiated area and all underwent interstitial HDR brachytherapy.



Figure 1. Tumor bed after resection of the recurrence



Figure 2. Brachytherapy catheters placed in the tumour bed

The characteristics of the analyzed group are presented in Table I.

Table I. Material characteristics – TNM staging

No.	Age	Sex	Primary tumour localisation	TNM
1	66	M	lower lip	T2N0
2	59	M	lower lip	T3N1
3	70	M	buccal mucosa	T2N0
4	50	M	larynx	T3N0
5	43	K	palate	T3N0
6	52	K	lower lip	T2N0
7	56	M	parotid	?
8	60	M	lower lip & oral commissure	T3N1
9	47	M	tongue	T2N1
10	61	M	lower lip	T3N1
11	39	K	tonsilla	T1N1
12	54	K	floor of mouth	T2N1
13	49	M	maxilla	T2/3?N0
14	71	M	base of tongue	T1N0
15	67	K	floor of mouth	T3N2

The external beam total dose ranged between 40 and 80 Gy. The time to local and/or nodal recurrence varied between 7 and 56 months (mean: 32 months). Only patients with a good general performance status (0-2pts ZUBROD.) and pathologically confirmed recurrence were qualified to salvage treatment. Treatment planning was based on computed tomography and/or nuclear magnetic resonance. Postresective defects reached some 10-36 cm. Reconstruction generally based on primary closure, skin grafting, and locoregional flaps (axial, random and pedicled). Pedicled pectoral muscle flaps (PMF) were used in 6 cases – for the reconstruction of the floor of the mouth, the tongue, the lower lip and the pharynx. We observed no complications during the postoperative period. Microvascular reconstruction was performed in 2 patients only, and in those cases the radial forearm free flap was used.

The histopathological status of the surgical margins obtained during salvage surgery was negative in 8 patients, close (less than 5 mm) in 4 patients and positive in 3 patients. Brachytherapy planning was performed with the integrated brachytherapy planning system (IBU), and based on imaging analyses performed before treatment. HDR brachytherapy was started 2 days after surgery. The reference points were individually chosen (from 4 to 8 mm from the catheter surface), the dose per fraction range was 3-5 Gy. 10 patients were treated with 2 fractions per day given with a 6-hour interval (dose per fraction 3 or 4 Gy) to a total dose of 32-36 Gy. In the case of 5 patients was performed with a single daily fraction of 5 Gy up to a total dose of 20 Gy. Total treatment time varied from 4 to 6 days, depending on the schedule.

Results

Salvage surgery followed by HDR brachytherapy was generally well tolerated. Partial tissue necrosis requiring consequential surgery in order to obtain adequate functional and aesthetic effects occurred in 2 patients. During the postoperative period the patients developed differences in the pallor of the irradiated skin and the

skin graft, depending on the type of reconstruction and the choice of radiotherapy schedule. Minor complications in wound healing were observed in 3 patients. 2 patients had to be re-operated due to problems with wound healing. Complications were observed in 46.6% of patients; of these 33.3% required surgery – such as simple fistula closures with local tissues i.e. buccal mucosa, the sterno-cleido-mastoideus muscle or neighbouring skin. We did not observe acute radiation toxicity, nor any difficulties with the removal of the catheters.

Discussion

Salvage surgery combined with postoperative HDR brachytherapy is generally well tolerated by patients with advanced locoregional recurrence of H&N cancer. The combination of these two methods allows to treat “non-resectable” recurrent tumors or non-mobile metastatic nodes and provides an opportunity to achieve wide, microscopically radical surgical margins [7]. Over the last few years the role of brachytherapy as a sole modality, or combined with surgery, has been increasing.

Literature data suggests that the toxicity of brachytherapy as part of the combined treatment of advanced or recurrent H&N cancer relates, basically, to LDR brachytherapy and intraoperative treatment. Unfortunately, literature data concerning HDR brachytherapy is not numerous and bases on small patient groups [8-10].

Smith et al. have assessed the early complications of combined treatment (surgery and postoperative HDR brachytherapy) in 9 patients with advanced H&N cancer [11]. Prolonged wound healing, flap necrosis and infections have been described as the most common reactions. They observed toxicity in over half of the cases, which is comparable to the complication rate, which we have observed in patients with primary H&N cancer treated by surgery and postoperative LDR brachytherapy.

Park et al. describe the total morbidity rate as 36%, but among patients who had undergone rotational flap reconstruction this reaches 56% [5]. In our patient group the ratio of all complications was 46,6%, comparable to published data. Problems with graft healing were observed in 2 patients (13.3%) – both required second grafting. In literature this kind of complication is described in 12 to 20% of patients after combined salvage treatment [12-15].

The HDR brachytherapy protocol applied as adjuvant therapy after surgery in our institution resembles that presented by Smith et al. – i.e. total doses of 20 to 46Gy fractionated twice daily with at least a 6-hour gap.

Conclusions

HDR brachytherapy as adjuvant treatment after previous surgery in patients with advanced, recurrent H&N cancer is a relatively safe modality and it does not increase the

risk of early toxicity. The complication rate is acceptable in patients with poor prognosis.

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