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Short Communication

Endoscopic microwave coagulation therapy for early recurrent T1 nasopharyngeal carcinoma

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ABSTRACT

The result of reirradiation in recurrent T1 (rT1) nasopharyngeal carcinoma (NPC) is unsatisfactory. We sought to study the efficacy and complications of endoscopic microwave coagulation therapy (MCT) in salvaging rT1 NPC after primary radiotherapy. Between August 1994 and April 2005, 55 patients with rT1 NPC were treated with endoscopic MCT. With a median follow-up of 102.1 months, 52 of 55 patients are still alive. Five patients had local failure after retreatment. The overall survival and local progression-free survival were 100% (95% CI, 99.4% to 100%) and 94.5% (95% CI, 94.1% to 94.9%) at 2 years, respectively, and 93.6% (95% CI, 93.5% to 94.4%) and 90.7% (95% CI, 90.2% to 91.2%) at 5 years. The common complications of endoscopic MCT were mild postoperative pain and headache. Nasopharyngeal necrosis was transient in one patient and subsided in 1 month. Endoscopic MCT achieved significant survival and tumour control without severe complications in selective rT1 NPC.

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1. Introduction

Nasopharyngeal carcinoma (NPC) is common in Southern China, with an annual incidence of 25–50 per 100,000.¹ Radiotherapy remains the mainstay of treatment for NPC. Local recurrence, seen in 18–35% of patients with NPC after radical radiotherapy,^{2–5} remains a difficult and challenging management problem. Microwave coagulation therapy (MCT) is a form of local ablation therapy by which tumours are destroyed by thermal coagulation.^{6,7} The therapeutic efficacy of microwave coagulation in the treatment of patients with

early locally recurrent T1(rT1) NPC has not been determined. We report the results of 55 patients with rT1 NPC treated with endoscopic MCT.

2. Materials and methods

2.1. Patient characteristics

Between August 1994 and April 2005, 55 rT1 NPC patients were treated prospectively with endoscopic MCT at the Department of NPC, Sun Yat-Sen University Cancer Centre.

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The present study was approved by the ethical committee of Sun Yat-Sen University Cancer Centre. Written informed consent was obtained from all the patients. All patients had World Health Organisation (WHO) Category III histology. Initial and recurrent tumours were staged according to the American Joint Committee on Cancer system.⁸ Endoscopic MCT was performed when the following criteria were satisfied: (1) Lesions should be confined to the nasopharynx (rT1) as shown on the computed tomography (CT) scan or magnetic resonance imaging (MRI). (2) Small superficial lesions that can be defined on macroscopic examination during endoscopy should have a tumour diameter ≤ 1.5 cm and should not involve the eustachian cushion. (3) For those tumours located in the pharyngeal recess, there should not be any extension to >0.5 cm depth from the pharyngeal recess base. (4) Nodal or distant metastasis should be absent. MCT had been impossible to carry out in rT1 cases which involved the anterior wall of the nasopharynx. There were 36 male and 19 female patients, aged from 28 to 64 years (median, 41 years). The majority (81.8%) of the tumours involved the roof and/or posterior wall, 10.9% affected the pharyngeal recess, and 7.3% occupied the roof and pharyngeal recess. The initial disease was Stage I in nine (16.3%), Stage II in 33 (60.0%), Stage III in ten (18.2%), and Stage IV in three (5.5%) of the patients. Table 1 summarises the patients' characteristics.

2.2. Endoscopic microwave coagulation strategy

MCT was carried out during ambulatory hospitalisation. The cost of the procedure was 750 Yuan RMB (including instrumentation, hospitalisation). MCT was performed using a microwave generator (Jiahe Inc., Zhuhai, China). The generator produces microwave energy at a frequency of 2450 MHz

and a wavelength of 12 cm. Microwave coagulation was performed by puncturing the tumour with a needle of 1.5 cm length (output power 80 w for 8–12 s). The needle was circular in shape so as to avoid damage to the normal tissues. MCT was performed under topical anaesthesia (1% tetracaine w/v). The patient lay in a supine position and the needle was inserted via the middle or inferior meatus to the treatment position of the nasopharynx. Needle-puncturing was performed under direct vision by fiberoptic nasopharyngoscopy. The coagulation area included 0.5 to 1 cm margins around the tumour. One course of microwave coagulation of each tumour consisted of a series of 8–12 s coagulation periods; each period was followed by a 10 s coagulation free period. This cycle was repeated approximately 8–12 times by changing the position of the electrode. The needle was inserted repeatedly until the ablated area turned dark tan in colour. Necrotic tissue was then reduced by using forceps. Cefuroxime 250 mg twice daily for 7 days was usually prescribed following endoscopic MCT. Patients were instructed to irrigate the nasopharynx with normal saline daily. A visual analogue scale was used for pain evaluation after operation.⁹ Acetaminophen 500 mg three times daily was administered in some of the patients. Subsequent follow-up procedures included fiberoptic nasopharyngoscopy and debridement of the necrotic crust every week until healing. If fiberoptic nasopharyngoscopy detected residual tumour in the second week and this was confirmed histologically, MCT was repeated on compensated patients. Ten patients received a second MCT.

2.3. Follow-up after salvage treatment

Follow-up included physical examination and evaluation of the nasopharynx by direct fiberoptic nasopharyngoscopy

Table 1 – Characteristics of patients with recurrent nasopharyngeal carcinoma treated with MCT.

Characteristic	No. of patients (%)
Gender (n)	
Male	36 (65.5)
Female	19 (34.5)
Age (years)	
Median	41
Range	28–64
Primary treatment (n)	
Radiotherapy alone	45 (81.8)
Chemo-radiotherapy	10 (18.2)
First course radiotherapy dose (n)	
64–70 Gy	32 (58.2%)
72–78 Gy	23 (41.8%)
Time from first course radiotherapy to reirradiation (months)	
Median	22.1
Range	6.5–125.6
Histology	
WHO III	55 (100%)
T classification of recurrence ^a	
T1	55 (100%)
N classification of recurrence ^a	
N0	55 (100%)

Abbreviations: WHO = World Health Organisation; AJCC = American Joint Committee on Cancer.

^a The recurrence was restaged according to the AJCC 2002 staging system.

every 2 months in the first 2 years and then every 3 months after 2 years. CT and/or MRI of the nasopharyngeal and cervical regions were performed 2–3 months after MCT and every 6 months in the first 2 years and at yearly intervals after that. All patients underwent chest x-rays, bone scans and liver echo annually.

2.4. Statistical analysis

Data were expressed as means \pm standard deviations (SD). Overall survival and local progression-free rates were calculated using the Kaplan–Meier method.¹⁰ All statistical analyses were performed using the SPSS Version 10.0 software (SPSS, Chicago, IL).

3. Results

3.1. Survival and local control

With a median follow-up of 102.1 months (ranging from 22.4 to 153.9 months), 52 of 55 patients are still alive. Five patients had local failures after retreatment. None of them developed distant metastasis or cervical lymph node recurrence. At 2 and 5 years, the overall survival rates were 100% (95% CI, 99.4% to 100%) and 93.6% (95% CI, 93.5% to 94.4%), respectively, while the local progression-free survival rates were 94.5% (95% CI, 94.1% to 94.9%) and 90.7% (95% CI, 90.2% to 91.2%) for the same periods. The median time to secondary recurrence was 18.6 months (ranging from 5.5 to 30 months). Two (40%) of these failures occurred within 1 year, two (40%) within 1 to 2 years, and one (20%) within 2 to 3 years after retreatment.

3.2. Surgical complications

The operating time was 20.0 ± 3.7 min (range: 15–30 min). The energy used was 7710.5 ± 1670.1 J (range: 5120–12,000 J). The time for the tumour slough to occur and the nasopharynx to heal was 29.2 ± 3.2 days (range: 24–35 days). No patient had immediate operative complications such as bleeding. Most of the patients had mild postoperative pain and headache. The symptoms were alleviated gradually in about 2 weeks. Nasopharyngeal necrosis was transient in one patient and subsided in 1 month.

4. Discussion

Different strategies are usually applied in the salvage treatment of early-staged local failures of NPC. Teo and colleagues³ reported that the 5-year relapse-free survival for rT1 after reirradiation mainly with external beam irradiation was 30%. This poor result can be explained by the fact that tumours recurring locally after optimal modern primary radiotherapy were usually very radioresistant. Kwong and colleagues¹¹ demonstrated a 5-year overall survival rate of 53.6% and a local control rate of 63% in patients undergoing gold-grain implantation for rT1 lesions. This was definitely an improvement on prior reirradiation studies. However, gold-grain implants require a surgical dissection. Early out-

comes of intensity-modulated radiotherapy (IMRT) for patients with recurrent NPC have been encouraging,^{12,13} but long-term results in more patients are required to confirm any improvement in therapeutic ratio for IMRT.

Surgery has also been used successfully in the treatment of selected local rT1 NPCs.^{14–17} Fee and colleagues¹⁷ reported the actuarial 5-year overall survival rate was 73% for rT1 disease treated with nasopharyngectomy; however, 54% of the patients had surgical complications. This is the best outcome of a surgical series reported to date in the literature. Surgery may negate the late complications of radiotherapy but has its own set of toxicities.

We are interested in MCT, which has been successfully used to perform coagulation of hepatic tumours.^{6,7} The anatomy of the nasopharynx makes endoscopic MCT an ideal treatment for patients with a small recurrent tumour confined to the mucosa. The skull base is the deep margin of the roof and posterior wall of the nasopharynx, so the depth of needle insertion can be controlled based on the bone. Therefore, the bone is the deep margin of coagulation depth. For those tumours located in the pharyngeal recess, the depth of involvement of the tumour was evaluated by CT or MRI. The indication for MCT was that there should be no extension to >0.5 cm depth from the pharyngeal recess base, so the insertion of microwave needles would not lead to injury of the internal carotid artery. The present studies of endoscopic MCT for very early locally recurrent NPC demonstrated that this new modality had no serious adverse effects and could be performed safely. The 5-year local progression-free and overall survival rates were 90.7% (95% CI, 90.2% to 91.2%) and 93.6% (95% CI, 93.5% to 94.4%), respectively. It is not appropriate to compare the survival figures between salvage radiotherapy or surgery and endoscopic MCT directly because the patients' characteristics were different. Endoscopic MCT for locally recurrent NPC has many advantages, such as processing under topical anaesthesia without incision, mild damage to normal tissues, a clear operating visual field, less haemorrhage and postoperative pain, complete coagulation of the tumour, and no need for postoperative radiotherapy.

Early detection of recurrent NPC is very important. Positron emission tomography (PET) is more highly accurate for detecting residual or recurrent head and neck squamous cell carcinoma compared to CT-scan.¹⁸ PET for the follow-up after MCT would be more valuable than CT-scan.

In conclusion, for selective patients with rT1 NPC, endoscopic MCT is an effective treatment and achieves good local control.

Conflict of interest statement

None declared.

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