Preliminary HDR nasopharyngeal intracavitary insertion with a modified Rotterdam nasopharyngeal applicator (RJ1) at Rajavithi Hospital.

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Abstract:

A high dose rate Iridium-192 brachytherapy machine has been installed at Rajavithi hospital in September 1999. Nasopharyngeal intracavitary insertion is a pupular technique in brachytherapy practices so the new applicator (RJ1) was modified from originally Rotterdam nasopharyngeal applicator (designed by Prof. P. Levendag). We found that this applicator is easy to apply and require only topical anesthesia fot the insertion. This silicone applicator snuggly and comfortably fixed to the nasopharyngeal mucosa.

Introduction

Nasopharyngeal cancer is a common head and neck cancer in Asia. It is the seventh most common cancer in Thai according to the incidence of Ramathibodi hospital (1). Radiotherapy plays a major role in the treatment of this disease either with external radiation alone or combination with intracavitary brachytherapy. In the past brachytherapy usually was given in the recurrent cases, therapeutic salvage of local failure after ERT can be achieved with intracavitary irradiation of the nasopharynx(3-5). In the DDHCC Rotterdam, intracavitary irradiation has been the method of choice for boosting at the primary (6). Wang (7) reported 146 patients with primary T1-T3 of nasopharyngeal cancer a 5year actual local control 91% for boost by means of brachytherapy versus 60% for boosting by means of EBRT (p=0.0002).Pryzant et al (8) reported that in 53 patients with recurrent nasopharyngeal cancer, 5 year disease-free survival of 44% for brachytherapy versus 14% for EBRT (p=0.019) and a 5 year overall survival of 60% for brachytherapy versus 16% for EBRT (p=0.029) were observed. In Thailand there are several types of nasopharyngeal applicators in clinical use namely oral approach metallic nasopharyngeal applicator, intranasal approach rubber tube and plastic nasal tube. And also there are several techniques to apply the applicator either direct intranasal technique or posterior nasal technique. One popular intracavitary nasopharyngeal applicator is a simple silicone mould, the so-called Rotterdam applicator, inserted by posterior nasal technique.

A high dose rate Iridium-192 brachytherapy machine has been installed at Rajavithi hospital in September 1999. Nasopharyngeal carcinoma is a common cancer at Rajavithi hospital so a new applicator (RJ1) was modified from originally Roderdam nasopharyngeal applicator .

Material and Methods

1. Silicone tube with a outer diameter4mm. and inner diameter of 2mm.
2. Primer and adhesive.
3. All the treatment were done in out patient setting.
4. HDR Iridium-192 Machine by WD-HDR Remote Afterloading System for Brachytherapy (GUANG Weida Medical Apparatus).(fig.1)
5. Treatment planning.

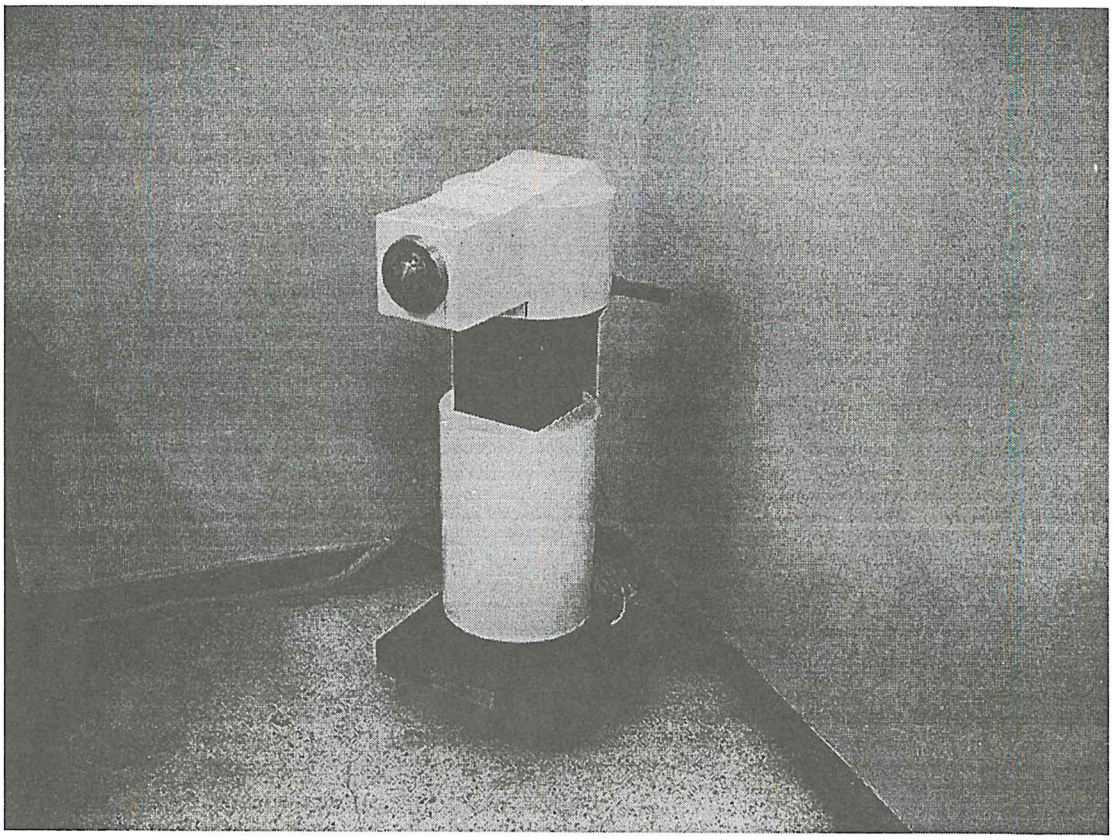


Figure1. HDR Iridium-192 Machine by WD-HDR Remote Afterloading System for Brachytherapy (GUANG Weida Medical Apparatus)

There were 9 nasopharyngeal cancer patients treated by RJ1 nasopharyngeal applicator (fig.2) at Rajavithi hospital. Among those patients there are 8 new diagnosed nasopharyngeal cancer patients and one recurrent case. The fresh cases are treated by combination of external irradiation and intracavitary nasopharyngeal brachytherapy but the recurrent case are treated by using brachytherapy alone. Every patients have to see radiation oncologist for selection of suitable size and shape of applicators. There are several size and shape of applicators depending on anatomical structures. The RJ1 nasopharyngeal applicator can also be customized for each patient by using silicone tube , primer and adhesive. It can be clean and sterilized several times. This device can be easily introduced under topical anesthesia (fig.3) after that subsequently anterior/posterior and lateral x-ray film are taken for the purpose of orthogonal reconstruction and the planning and dose calculation is done by computerized planning system. The patient is then treated according to the plan.

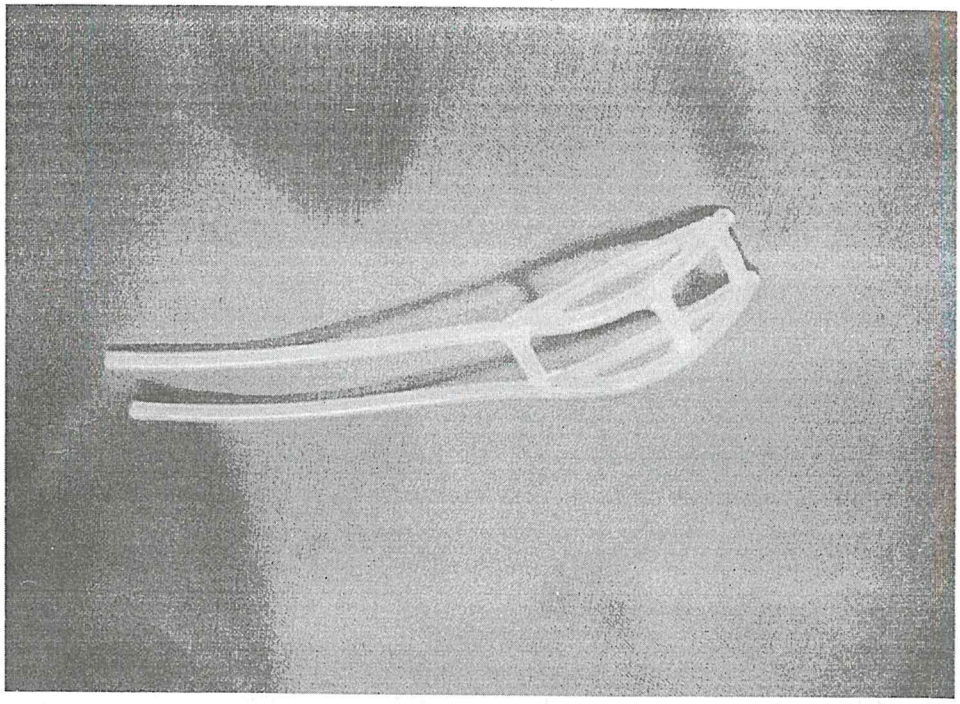


Figure2. RJ1 nasopharyngeal applicator

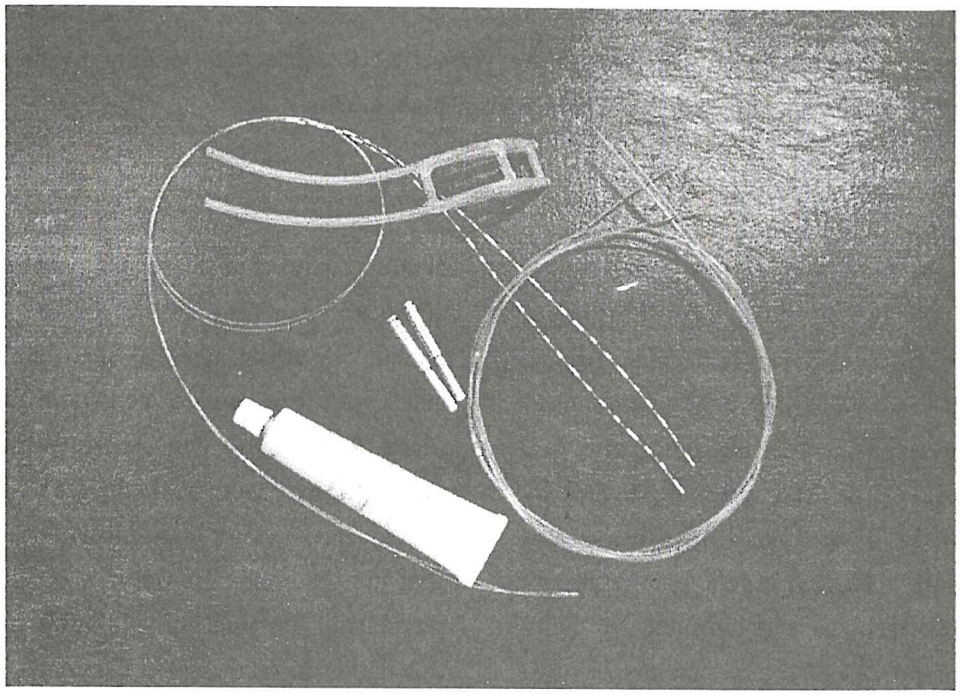


Figure3. sets of devices for HDR nasopharyngeal intracavitary insertion with modified Roderdam nasopharyngeal applicator (RJ1) at Rajavithi hospital.

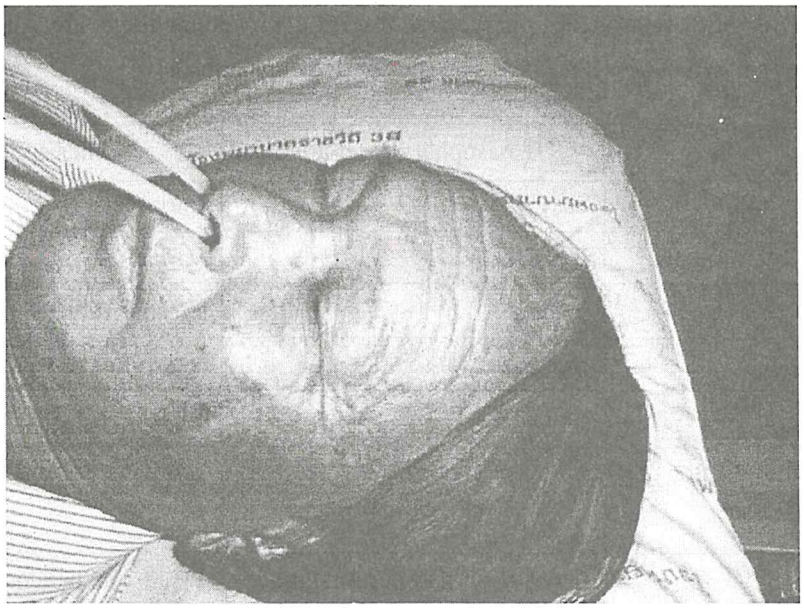


Figure 4. patient with RJ1 nasopharyngeal applicator

Result

About 5 months of experience in using this RJ1 applicator we found that there are some differences between RJ1 nasopharyngeal applicator and rigid applicator provided by the vender (table1).

	RJ1 nasopharyngeal applicator	rigid applicator provided by the vender
Distance between 2 tube	Adjustable for different application	Fixed
Outer diameter Inner diameter	4mm. 2mm.	5.5mm. 3.5mm.
Price	Very cheap (approx. 1us$)	Very expensive (thousands of dollars)
Material	silicone	Silicone
Suitable for	Thai	European

Table1 some differences between RJ1 nasopharyngeal applicator and rigid applicator provided by the vender represents

According to intracavitary nasopharyngeal insertion procedure there are some differences between RJ1 nasopharyngeal applicator and previous applicators (table2).

	RJ1 nasopharyngeal applicator	other applicators
Procedure	easy	variable
Time to apply	Very short	variable
Material	silicone	Plastic ,rubber ,metal
Number of usage	multiple	1-2 times or multiple
Anesthesia	topical	topical
Mobilization of applicator during treatment	no	probable
Fixation	Fixed itself and permits good geometry	Fixed with balloon and difficult to control and some could not fix
Isodose distribution	symmetry	unpredictable
Distortion on CT or MRI	No	Some especially the metallic applicator

Table 2 represents differences between RJ1 nasopharyngeal applicator and previous applicators

Discussion

This RJ1 nasopharyngeal applicator is easy to apply and require a topical anesthesia and that would closely conform to the mucosa of nasopharynx. It is suitable for Thai.

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