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Nabeel Nori Mukhlif


وأنزل الله عليك
الكتاب والحكمة
وعلَّمَكَ مَا لَمْ تَكُن
تَعْلَمُ وكَانَ فَضْلُ
اللَّهِ عَلَيْكَ عَظِيماً
صدق الله العظيم
سورة النساء الآية (١١٢)

INTRODUCTION

Laryngeal carcinoma is the second most common head and neck cancer after skin cancer and accounts for 3% of total cancer risk ***(Silverberg et al., 1990).***

Total laryngectomy is still one of the most common and effective modalities in treatment of cancer larynx ***(Maran, 2000).***

Adequate nutrition is an important aspect of postoperative management of total laryngectomy. Traditionally, this has been provided through nasogastric feeding tube (NGT) inserted intra operatively for 7 to 14 days after total laryngectomy. This practice developed from assumption that early initiation of oral feeding might lead to pharyngocutaneous fistula (PCF). The time after which it is safe to initiate oral feeding and its role in PCF formation after total laryngectomy remains controversial ***(Seven et al., 2003).***

Development of pharyngo-cutaneous fistula (PCF) is the most common and troublesome postoperative complication following laryngectomy. Billroth was the first person to report PCF as a complication in 1873 ***(Saki et al., 2008).*** It follows total laryngectomy and can occur in the immediate post-operative phase (less than 30 days after surgery) or rarely, later.

It creates a communication between the pharynx and cervical skin around the surgical incision or, less frequently, the stoma of the tracheostomy. Pharyngeal contents, usually saliva, flow through the fistula emerging from the cutaneous orifice ***(Sarra et al., 2009).***

It is a major cause of morbidity in terms of delayed oral feeding, prolonged hospitalization, and possible additional surgery. Moreover, it may lead to fatal complications such as carotid artery rupture ***(Virtaniemi et al., 2001).***

Involved neck skin becomes tender and dark red ***(Saki et al., 2008).***

In most cases, the occurrence of a fistula results in prolongation of hospital stay with increased burden on the patient, surgeon, and health care system ***(Eustaquio et al., 2009).***

It is now known that the skin incision heals in a watertight fashion within 24 to 48 hours. It is reasonable to assume that the pharyngeal mucosa could also do so within the same period of time ***(Prasad et al., 2006).***

Some surgeons have thought that the motion of the NGT may cause additional stress to the suture line in the postoperative period and contribute to PCF development ***(Soylu et al., 1998).***

The presence of a NGT is a risk factor for gastroesophageal reflux, which may cause irritation to the wound and also discomfort to the patient ***(Prasad et al., 2006)*.**

The nasogastric tube (NGT) itself has several complications such as permanent nasal alar deformity, acute sinusitis, pneumothorax, aspiration pneumonia, gastroesophageal reflux and persistent dysphagia ***(Saydam et al., 2002 and Seven et al., 2003).***

In the first 24 to 48 hours postoperatively, patients usually begin swallowing their own saliva. The saliva that is not swallowed may pool around the wound, degrading the suture material used in closure. These factors cannot be completely avoided, but the question remains as to whether or not the addition of oral intake exacerbates such stresses ***(Eustaquio et al., 2009).***

The concept that feeding stresses the suture line is wrong,because the pharynx acts more like a conduit after laryngectomy ***(Prasad et al., 2006)*.**

Horgan and Dedo(1979) suggested that the wide variability in the rate of fistulization could be extensively explained by variation in patient selection and surgical technique**.**

Early oral feeding has been shown to maintain the gut mucosal barrier, reduce septic complication and prevent the development of negative nitrogen balance. All of these factors possibly contribute to the maintenance of gut immune system and enhance wound healing ***(Prasad et al., 2006)*.**

Following total laryngectomy, the reported advantages of early oral feeding are increased patient comfort and confidence, reduced length of hospital stay and reduced financial cost ***(Prasad et al., 2006)*.**

To start oral feeding and exclude the presence of a pharyngocutaneous fistula, an objective test and instrumental assessments using videofluoroscopy, have been described. videofluoroscopy offered the possibility to precisely identify the presence of pharyngocutaneous fistula and the location of its internal orifice and to monitor its spontaneous closure. Therefore, important information could be obtained regarding the suture line status and the possibility of deciding whether to remove the nasogastric tube or to leave it in place ***(Galli et al., 2009).***

AIM OF THE WORK

The aim of this thesis, is to assess the value and effect of early oral feeding (2-5days), using a videofluoroscopic assessment as a test before starting early feeding. versus the effect of nasogastric tube feeding on the incidence of pharyngo-cutaneous fistula (PCF) and the duration of the hospital stay after total laryngectomy.

INCIDENCE

The reported incidence of PCF ranges from 9 % to 50 % ***(Virtaniemi et al., 2001).***

The Incidence of fistula formation was 15.8% (three of 19) for glottic tumors, 26.4% (five of 19) for supraglottic tumors, and 57.8% (11 of 19) for the sum of transglottic and subglottic tumors in the work of Nader Saki ***(Saki et al., 2008),*** **(table 1)** shows other reported incidence.

Table (1): Incidence of pharyngo-cutaneous fistula after total laryngectomy in the literature

Articles	No. of patients	No. of fistulae	%
Papazoglou et al. (1994)	310	28	9
Soylu et al. (1998)	295	37	12.5
Redaeli et al. (1999)	246	40	16
Virtaniemi et al. (2001)	133	20	15
Abdel-Aziz,et al. (2003)	214	34	16
Joseph et al. (2006)	187	37	19.7
Dedivitis et al. (2007)	55	7	12.7
Sharifian et al. (2008)	25	2	8
Saki et al. (2008)	146	19	13

The different reports of incidence of PCF have always been trying to make an etiological link between the incidence

and one of the different predisposing factors. Statistical studies of the different incidences of PCF try to signify and rank the most important factor in its pathogenesis ***(Abdel-Aziz et al., 2003).***

PREDISPOSING FACTORS

The predisposing factors classified into:

A. Pre-operative factors

B. Operative factors

C. Post-operative factors

A. PRE-OPERATIVE FACTORS:

I. Patient features.

II. Previous irradiation.

III. Systemic diseases.

IV. Preoperative tracheostomy.

(A.I) PATIENT FEATURES

PCF is more common in males than females. Old age may increase PCF incidence due to poor healing activity and bad general condition of elder patients ***(Dedivitis et al., 2007).***

Table (2): Patient distribution according to demographic, clinical, and treatment characteristic and occurrence of PCF (number of patients 55) quoted from ***(Dedivitis et al., 2007).***

Variables	Category	**Pharyngo-cutaneous fistula (%)**	
		Yes	No
Sex	Male	7(14.0%)	43(86.0%)
	Female	0 (0.0%)	5(100.0%)
Age (years)	> 60	1(3.6%)	27(96.4%)
	≤ 60	6(22.2%)	21(77.8%)
Tumor site	Glottic	4(13.3%)	26(86.7%)
	Subglottic	0(0.0%)	3(100.0%)
	Supraglottic	2(13.3%)	13(86.7%)
	Piriform sinus	1(14.3%)	6(85.7%)
Tumor stage	T2-	3 (7.7%)	36(92.3%)
	T4	4(25.0%)	12(75.0%)
Neck dissection	No/other types	1(3.7%)	26(96.3%)
	Bilateral radical	6(21.4%)	22(78.6%)
Previous radiation therapy	No	4(9.8%)	37(90.2%)
	Yes	3(21.4%)	11(78.6%)
Previous tracheotomy	No	4(8.0%)	46(92.0%)
	Yes	3(60.0%)	2(40.0%)
Pre operative blood transfusion	No	4(8.7%)	42(91.3%)
	Yes	3(33.3%)	6(66.75)
Closure with stapler	No	6(12.2%)	43(87.8%)
	Yes	1(16.7%)	5(83.35)

(A.II) PREVIOUS IRRADIATION

The definite relation between preoperative irradiation and fistula formation was best illustrated by *Keith (1993)*.

The incidence of PCF in non irradiated cases was 9.8% compared to irradiated cases the incidence was 21.4%; so, preoperative irradiation increase PCF incidence about 10% to 12%. This incidence associated with doses lower than 5000 cGy, but with higher doses from 6800 to 7200 cGy, PCF incidence may reach 80% ***(Keith et al., 1993).***

Radiotherapy is well known to produce many side effects. It is stated that the therapeutic ratio between the dose required curing squamous cancer and the dose at which unacceptable morbidity occurs is small ***(Ferlito, 2000).***

The most commonly seen acute complications of radiotherapy for head and neck cancer are on the skin and mucosa. Skin reaction range from erythema and dry desquamation to moist desquamation and ulceration with necrosis, depending on the type of radiation, energy used, the area treated, doses and fractionation used. When orthovoltage (blow 300 kvp) or electron energy are used, erythema will appear with doses of about 3000 rads in 3 weeks, dry desquamation with slightly higher doses, and moist desquamation with 4500 to5000 rads. With cobalt-60, high

energy x-rays (above 4 Mev), neutrons and electrons, subcutaneous fibrosis is frequently observed with doses over 5000 rads. With high doses of irradiation, severe ulceration and necrosis of the skin may be seen ***(Maran, 2000).***

Reaction in the oropharyngeal and laryngeal mucosa are related to damage of the germinal cell layer of the epithelium and to vascular changes. The acute phase of radiation reaction manifests by increased vascular permeability and interstitial edema with associated inflammatory changes. During the first 2-3 weeks erythema of the mucosa is followed by studded mucositis. At this point, the patient begins to complain of a sore throat. After 4000 rads, a patchy fibrinous exudates may be seen, becoming more confluent with doses of over 5000 rads ***(Maran, 2000).***

The mucosa undergoes a series of changes similar to skin when irradiated. First erythema occurs, and then a fibrinous exudate may form. This exudate, at first is not uniform and the appearance is described as a patchy membranous reaction. Subsequently, it may involve the whole of the treated area and forms a confluent membranous reaction. The mucosal surfaces are also prone to develop Candida ***(Maran, 2000).***

After apparently complete recovery from acute effect has taken place, the stem cell pool of rapidly dividing tissues is often

depleted. This means that the tissue in question is prone to subsequent damage by relatively trivial insults. For example, a biopsy of soft tissue in a previously irradiated area can lead to an area of localized necrosis which may not readily heal ***(Maran, 2000).***

The late effects of radiotherapy on skin and mucosa include: cosmetic changes and the disrupted vasculature may lead to problems with wound healing if subsequent surgery is required. This is why it could be only helped by the use of vascularized flap to repair the defects resulting from salvage surgery ***(Maran, 2000).***

The increased incidence of PCF after radiotherapy **(table 2)** can be explained by two main actions of radiotherapy; Firstly, its action on the cells by DNA damage, destruction of stem cells, inhibition of imminent mitosis followed by abnormal mitosis, disruption of the cells and damage to resting cells so that continued proliferation fails. Secondly, hyperemia of the blood vessels due to distention of capillaries that may be thrombosed or ruptured. It may be completely obliterated due to subintimal fibrosis and degeneration of elastic lamina, which lead to endarteritis obliterans and affects the ability of the body for neovascularisation; so, dermis and epidermis supplied by these vessels will show ischemic changes, atrophy and fibrosis. Ischemia leads to formation of dense bands of collagen in the

dermis; also, it increases susceptibility to infection. All these effects lead to delayed wound healing in previously irradiated areas ***(Walter and Israel, 1996).***

In biological terms, it is not the physical dose alone to the tumour that affects the incidence of PCF, but other factors should be addressed, which are: number of fractions, fraction size, and interval between fractions, overall time, volume treated and radiation quality e.g. photons or neutrons and beam energy. All these parameters in the pre-operative radiation therapy will influence the post-operative development of complications and specifically the development of PCF ***(Maran, 2000).***

(A.III) SYSTEMIC DISEASES

The systemic diseases of the patients like (Anemia, diabetes, liver diseases, cardiac failure, gastro-esophageal reflux disease, nutritional status, preoperative blood transfusion …etc.) are important preoperative predisposing factors for the PCF formation:

1. Anemia:

Low preoperative hemoglobin increases the incidence of PCF nine-fold ***(Redaeli et al.1999)***

Anemia leads to a decrease in the oxygen carrying capacity of the blood thus causing hypoperfusion and predisposes to slow healing ***(Walter and Israel, 1996).***