Original Article

Study of factors affecting the outcome of caustic injury of upper gastro intestinal tract

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Abstract

Introduction: Ingestion of corrosive substances remains an important public health issue in Western countries despite education and regulatory efforts to reduce its occurrence. These injuries are still increasing in developing countries, related to the social, economic, and educational variables and mainly to a lack of prevention. Clinical presentation of corrosive injuries in the upper gastrointestinal tract depends on the physical state, type and quantity of the corrosive substance There were several reports that intramucosal injection of Mitomycin-C, a chemotherapeutic agent with DNA cross linking activity, was helpful to prevent strictures. **Aims and Objectives:** To study the effect of Mitomycin - C on corrosive stricture of upper GI tract (Oesophagus). **Result:** In the Mitomycin-C group there was considerable reduction in the number of dilatation (No. of dilatation measured during the 1 year studied) as compared with the Non - Mitomycin - C group. The Dysphagia Index improvement in the Mitomycin - C group is significantly high, compared to the Non - Mitomycin - C group. The average length of stricture in the Mitomycin - C group and non Mitomycin-C was not significantly different from each other. **Conclusion:** As Mitomycin-c group there was considerable reduction in the number of dilatation, as the Dysphagia Index improved in the Mitomycin - C group so definitely this drug is benefical in the management of post caustic injury in upper gastrointestinal tract but the more clinical trials are needed to establish the role in stricture prevention.

Keywords: Caustic Injuiry, Mitomycin-C, Oesophageal strictures.

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INTRODUCTION

Ingestion of corrosive substances remains an important public health issue in Western countries despite education and regulatory efforts to reduce its occurrence. These injuries are still increasing in developing countries[1,2], related to the social, economic, and educational variables and mainly to a lack of prevention[3,4]. Clinical presentation of corrosive injuries in the upper gastrointestinal tract depends on the physical state, type and quantity of the corrosive substance. Corrosive agents in powder or crystal state adhere to oral cavity and throat, causing the most severe injuries to these organs as opposed to the liquid agents that pass rapidly through the esophagus and cause severe corrosive burns to entire organ with predilection of the cricopharyngeal area, at the level of the aortic arch and the lower esophageal sphincter[5]. The most severe gastric injuries are those of the antrum and pylorus where the caustic substance remains for a very long time [6]. Absence of changes in the oropharynx does not exclude severe injuries of the other areas of the gastrointestinal tract. Hyper salivation, difficulty in swallowing, edema, ulceration or whitish plaques in the oral cavity, palatal mucosa and pharynx are common phenomena[7,8,9]. Absence of oropharyngeal local changes does not exclude severe esophageal injuries. In 10% to 30% of the patients with severe esophageal post-corrosive burns there are no local changes in the oropharynx. One extensive study re-ported on 37% of esophageal injuries of second and third degree in patients who had no apparent oropharyngeal injuries [10, 11]. There were several reports that intramucosal injection of

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Mitomycin-C, a chemotherapeutic agent with DNA cross linking activity, was helpful to prevent strictures[12,13].Curreent study is done see the effectiveness of treatment of Mitomycin-C in treatment of complications of caustic injury to upper gastro-intestinal tract. To study the effect of Mitomycin - C on corrosive stricture of upper GI tract (Oesophagus).

AIMS AND OBJECTIVES

To study the effect of Mitomycin - C on corrosive stricture of upper GI tract (Oesophagus).

METHODOLOGY

A sample of 59 patients have been taken of which 53 were acid poisoning and 6 were alkali poisoning. Among the 53 acid poisoning patients 20 were administered mitomycin - C after dilatation (group 1) and the rest were only dilatated (group 2). The two group are homogenous with respect to age, sex, length of strictures, number of strictures and type of organ affected. The matched group is compared for their average length of time between two successive dilatation. More the length of time better is the effectiveness of the medicine mitomycin - C. An independent `t' test has been carried out to confirm the results statistically. The samples selected for the present study are persons who are dysphagic due to caustic poisoning of the upper gastro - intestinal tract. Dysphagia refers to patients who have difficulty in swallowing. Symptomatic caustic poisoning refers to patients who present with dysphagia, pain during swallowing (odynophagia), vomiting and signs and symptoms of perforation like fever, pain, tachycardia, tachypnoea, haemetemesis, dyspnoea, stridor and shock. Dysphagia index (Atkinson's) was taken as a guideline for evaluating dysphagia and the response to treatment (Dilatation and Mitomycin - C spray).

RESULTS

Table 1: Distribution of patients as per Average time duration between Dilations

Average time duration between Dilations	No of Patients (N)	Correlation	't',df.	Significance
With Mitomycin	20	.500	18.858,19	P<0.000005,HS
Without Mitomycin	33	.618	10.308,32	P<0.000005,HS
Total	**53**			

We can see that there is a considerable reduction in the number of dilatation (No. of dilatation measured during the 1 year studied) required for the Mitomycin - C group when compared with the Non - Mitomycin - C group. The average number of dilatation for the Mitomycin - C group is 0.7 with a standard deviation of 0.657(P value = 0.000005) The corresponding average number of dilatation for the Non - Mitomycin - C is 10.3 with a standard deviation of 1.48 (P value = 0.000005). Thus we see a drastic improvement in Mitomycin - C group which is indicated by higher time interval between two successive dilatation.

Table 2: Distribution of patients as per Dysphagia Index

Type of treatment	No of Patients (N)	Correlation	't' ,df.	Sig
With Mitomycin - Dysphagia Index BandA	20	.0500	18.856	.025,S
Without Mitomycin – Dysphagia Index BandA	33	.618	10.308	.006,HS
Total	**53**			

The improvement in the Mitomycin - C group is significantly high, compared to the Non - Mitomycin - C group. The average decrease in the dysphagia index for the Mitomycin - C group is 2.55 with a standard deviation of 0.605(P value = 0.025). The similarly average reduction in the dysphagia index for the Non - Mitomycin - C group is 1.73 with a standard deviation of 1.18 (P value = 0.006). This implies the improvement is significantly high in the Mitomycin - C group at 0.05 level of singificance.

Table 3: Distribution of patients as per average number of stricture

Type of treatment	Multiple/Single Stricture			Total
	1	2	3	
With Mitomycin	16(80.0%)	4(20.0%)	0(0%)	20 (100%)
Without Mitomycin	26(78.8%)	6(18.2%)	1(3.0%)	33(100%)
Total	**42(79.2%)**	**10(18.9%)**	**1(1.9%)**	**53(100%)**

X^2 =6.30, df=2, p>0.05.

The average number of stricture in the Mitomycin - C group is 1.4 with a standard deviation of 0.598. The average number of stricture in the Non Mitomycin - C group is 1.24 with a standard deviation of 0.502 (P value = 0.3087).

Table 4: Distribution of patients as per the average length of stricture

Length of Stricture	No of Patients (N)	Mean±SD	t' ,df	Sig.
With Mitomycin	20	1.91±.6060	-1.487,51	.143
Without Mitomycin	33	2.45±1.56	-1.791,45.163	.080

The average length of stricture in the Mitomycin - C group is 1.91 cm with a standard deviation of 0.60 cm. The corresponding mean and standard deviation for the Mitomycin – C, 1.91, 0.61(P=0.143) the corresponding mean and standard deviation for the Non - Mitomycin - C group is 2.45 cm and 1.56 (P = 0.182).

DISCUSSION

The average number of stricture in the Mitomycin - C group is 1.4 with a standard deviation of 0.598. The average number of stricture in the Non Mitomycin - C group is 1.24 with a standard deviation of 0.502 (P value = 0.3087). The average length of stricture in the Mitomycin - C group is 1.93 cm with a standard deviation of 0.62 cm. The corresponding mean and standard deviation for the Non - Mitomycin - C group is 2.34 cm and 1.57 (P value = 0.182).These findings are similar to Kyung SikPark (2014)[14] The two groups are homogenous with respect to the size of dilatation. The average size of dilatation in the Mitomycin - C group is 13.06 mm with a standard deviation of 1.87 mm. The corresponding average size of dilatation in the Non - Mitomycin - C group is 12.21 with a standard deviation of 2.41 (P value = 0.308). These findings are similar to Khaled El-Asmar *et al* (2011)[14] The dysphagia index was measured at the time of admission and at the end of treatment. The dysphagia index is measured according to Atkinson's dysphagia index in a 5 point scale ranging from 0 to 4. The difference between these two indeces, one at the time of admission and the other at the end of treatment is taken as measure of improvement. This difference is denoted by the variable "improvement index". i.e. Improvement index is equal to dysphagia index at admission minus dysphagia index at the end of treatment. The two groups are compared for improvement using the variables "average time length between dilatation" and "dysphagia index". Both of these variables show significant improvement (Statistically significant at 0.05 level) in mitomycin - C group compared to the non mitomycin - C group, which brings out the efficacy of the drug mitomycin - C. The improvement in the Mitomycin - C group is significantly high, compared to the Non - Mitomycin - C group. The average decrease in the dysphagia index for the Mitomycin - C group is 2.55 with a standard deviation of 0.605. The similarly average reduction in the dysphagia index for the Non - Mitomycin - C group is 1.73 with a standard deviation of 1.18 (P value = 0.006). This implies the improvement is significantly high in the Mitomycin - C group at 0.05 level of singificance. These findings are similar to Khaled El-Asmar *et al* (2011)[14] in their study, in12 patients with resistant caustic esophageal stricture were followed at our unit of whom six had a short esophageal stricture (<3cm) and six had a long stricture (>3 cm). Topical mitomycin C application resulted inclinical and radiological resolution of dysphagia andstrictures in 83% and 66% respectively, compared with44 (eight out of 18 patients with short stricture) and 25% (two out of eight patients with long stricture) in, Also we can see that there is a considerable reduction in the number of dilatation (No. of dilatation measured during the 1 year studied) required for the Mitomycin - C group when compared with the Non - Mitomycin - C group. The average number of dilatation for the Mitomycin - C group is 0.7 with a standard deviation of 0.657. The corresponding average number of dilatation for the Non - Mitomycin - C is 10.3 with a standard deviation of 1.48 (P value = 0.001). These findings are similar to Khaled El-Asmar *et al* (2011)[14]. Thus we see a drastic improvement in Mitomycin - C group which is indicated by higher time interval between two successive dilatation. To our knowledge, no data exist that indicate the most effective concentration, duration or frequency of application of mitomycin C. We used a solution of 1mg/ml of mitomycin C and applied this to the stenosis for 5 minutes in adults and 0.4 mg/ml for 2 minutes in children. This concentration was effective and did not cause any complications during follow-up over an average of 12 months. However, the important questions of its use in children and of theoretical risk of secondary malignancy over the long term have not been addressed. We note that the mutagenic effects of mitomycin C applied to esophageal burns have not been studied. We found no dysplasia in the biopsies we took from the strictures during the follow up period, but because of these risks, such patients require long - term follow - up with regular endoscopic examinations.

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