

# Hyaluronidase Injection and Multiple Puncture Technique in the Treatment of Paraphimosis: A Comparative Study

Dr. Kiran Kumar<sup>1</sup>

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## Abstract

Background: Paraphimosis is a surgical emergency in surgical practice. A number of treatment options are available for treatment of paraphimosis including surgical and non surgical ones. No randomized studies were undertaken to compare any treatment techniques of paraphimosis. This study attempts to compare the outcome of injection of Hyaluronidase and Multiple puncture technique in the treatment of paraphimosis. Materials and methods: A randomized controlled study was undertaken in the surgery department of a medical college. About 60 consecutive patients admitted with the history of paraphimosis were randomly divided into two groups. One group received Hyaluronidase injection and another group had been treated by using multiple puncture technique. The patients were followed on seventh day and six months after the surgery. Results: The study group included both pediatric and adult population. About 43.3

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**Index terms**— paraphimosis, hyaluronidase, multiple puncture technique, randomized controlled trial.

## 1 I. Introduction

Paraphimosis is not a common condition but when presented, it is a surgical emergency in day to day surgical practice. Paraphimosis is a condition of retraction of the foreskin behind the glans penis in uncircumcised males. The condition is common in young boys and this entity is rare in middle and elderly males. 1 The phimosi can be congenital or acquired is the causative factor for paraphimosis in most of the cases. The congenital phimosi mainly occurs in the young children and acquired is more common in elderly population may be a result of poor hygiene, chronic balanoposthitis or forceful retraction of the prepuce, leading to a tight fibrotic ring. 2 This painful medical condition requires urgent attention and early reduction. If the paraphimosis left untreated, the paraphimosis leads up in severe consequences including strangulation of the glans and tissue necrosis. 3 The goal of treatment of paraphimosis is reducing the penile edema and restoring to the prepuce to its original position. A number of treatment methods are available for the paraphimosis. They include the use of gentle manual compression, osmotic agents or ice. The invasive modes of treatment include glans aspiration, dorsal slit procedures, injection of Hyaluronidase etc which are often used when the non invasive methods fails. 4 The literature available shows the success and failures of different treatment methods in one or two cases. Similarly, the literature shows that the Hyaluronidase injection has shown efficacy in two cases. 5 The Hyaluronidase degrades the hyaluronic acid and enhances the diffusion of trapped fluid in the tissue planes to decrease the preputial swelling. 6 Where as multiple puncture technique permits the safe and effective evacuation of the trapped fluid. 7 None of the studies are available to compare the efficacy and recurrence of these methods in the literature available. Hence, this study was undertaken in a tertiary care setting in Karnataka.

## 2 II. Materials and Methods

A randomized controlled study was taken up in order to determine the efficacy and recurrence of multiple and puncture technique and injection of hyaluronidase in the general surgery department of Basaveshwara Medical

College and Hospital, Chitradurga. About 30 patients admitted to the surgery department were randomly divided in to two groups with the help of computer generated random numbers. In the patients of multiple puncture technique group, using a 24 -26 G needle one or several openings were done in the edematous prepuce distal to the constricting ring to allow the edematous fluid to escape from the puncture sites with the manual compression of the glans and prepuce. In Hyaluronidase group, injection of Hyaluronidase was given into one or more sites of the edematous prepuce to facilitate the reduction of paraphimosis. The patients were followed up after one of the procedure, 7 days and 15 days and at six months. The recurrence, need for surgery and success were noted in a predesigned proforma. The data thus collected was analyzed by using Statistical Package for Social Services (SPSS vs 21). Chi square test was applied to study the significance between the two procedures. At the end of six months of follow up, 10% of the patients in the Hyaluronidase group and 13.3% of the patients in the multiple puncture technique groups had recurrence of the paraphimosis. About 3.3% of the patients in Hyaluronidase group and 13.3% of the patients in the multiple puncture technique group needed surgery again within six months. About 3.3% of the patients in Hyaluronidase group and 16.7% in the multiple puncture technique group had post operative pain.

### 3 III. Results

## 4 IV. Discussion

This study was undertaken mainly to compare the two different procedures. The literature available is very sparse about the comparison of procedures. The sample size in those studies was also a problem where only cases studies can be found. The main concern behind paraphimosis repair is to relieve the pain and to reduce further ischemia of the glans penis.

This study has shown that the paraphimosis is a disease condition of both children and adult population. Skin changes and edema are the common accompaniments of the disease. The literature available shows that the phimosis is the main cause of paraphimosis in the pediatric population and acquired phimosis is the main cause for the paraphimosis in cases of adult population. 2 Skin changes and edema in the patients with paraphimosis also reported in other studies. 4 This condition mainly results in venous and lymphatic returns from the glans and distal foreskin is obstructed and these structures swell alarmingly causing more pressure within the obstructed ring of prepuce. 9 A number of treatment options are available for the management of paraphimosis including operative and non operative methods including puncture techniques, osmotic methods, aspiration methods and using Hyaluronidase etc. Multiple puncture technique is a common procedure often practiced frequently under even ordinary peripheral surgical settings. This procedure allows the edematous fluid to escape for the puncture sites with manual compression of the glans and prepuce. 10,11 The band of the prepuce has to be divided if the condition could not improve with these methods. 12 Injection of Hyaluronidase in to one or more sites of the preputial edema has been shown to facilitate the reduction of paraphimosis. 13,14 The main acting principle of Hyaluronidase disperses extracellular edema by modifying the permeability of intracellular ground substance in the connective tissue, enhancing diffusion of trapped fluid between the tissue planes to decrease the preputial swelling. Some of the studies consider that the method of reduction is not the effect of Hyaluronidase but punctures made during the procedure. This procedure is contraindicated in presence of infection. 15 Since the randomized controlled studies are lacking, this study results could not be compared. The Hyaluronidase group of patients had shown less chance of recurrence, need for further surgery and post operative pain when compared to the patients of multiple puncture technique group. The recurrence was observed in Hyaluronidase group among those who presented late to the surgeon. It may substantiate the acting principle of Hyaluronidase as reported by the available literature. 13,14 V. Conclusion

This study had shown that the injection of Hyaluronidase results in lesser recurrence, need for the surgery and post operative pain than the multiple puncture technique. This is a randomized controlled study of first of its kind. The results may help other researchers to undertake many more randomized controlled studies across different parts of the world to reproduce similar results. <sup>1</sup>



Figure 1: P

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Particulars		Hyaluronidase group	Multiple puncture technique group
		N = 30	N = 30
Age in years, Mean ( $\pm$ SD)		21.13 ( $\pm$ 9.6)	14.1 ( $\pm$ 7.3)
Etiology [n (%)]	Pediatric	13 (43.3)	16 (53.3)
	Adult	17 (56.7)	14 (46.7)
Skin changes [n (%)]	Absent	17 (56.7)	12 (40.0)
	Present	13 (43.3)	18 (60.0)
Edema [n (%)]	Absent	5 (16.7)	4 (13.3)
	Present	25 (83.3)	26 (87.7)

Figure 2: Table 1 :

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Outcome	Hyaluronidase group (N = 30) n (%)	Multiple puncture technique group (N = 30) n (%)
Recurrence	3 (10.0)	4 (13.3)
Need for surgery	1 (3.3)	4 (13.3)
Post operative pain	1 (3.3)	5 (16.7)

Figure 3: Table 2 :



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