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Original Article

Role of Intravenous Tranexamic Acid in Prevention of Seroma Formation after Umbilical and Para Umbilical Hernioplasty

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ABSTRACT

Umbilical and paraumbilical hernias are common conditions affecting a significant portion of the global population, with surgical intervention being a common treatment modality. Seroma formation is a common complication after hernioplasty. Tranexamic acid (TXA) has emerged as a promising prophylactic agent for seroma prevention, as it inhibits fibrin breakdown, reducing blood loss and blood transfusions. **Objective:** To evaluate the role of intravenous tranexamic acid in the prevention of seroma formation after umbilical and paraumbilical hernioplasty. **Methods:** It was a cohort study conducted at the department of surgery, Kulsoom Bai Valika Hospital, Karachi, Pakistan from Oct 2022 to Apr 2022. Patients aged 18 years or above who underwent umbilical and paraumbilical hernioplasty of either gender were involved in the study. The individuals were then categorized into two groups: the exposed group, consisting of patients who received intravenous tranexamic acid (IVTXA), and the unexposed group, comprising of patients who did not receive IVTXA. Both groups were monitored for a duration of three months to assess the incidence of seroma formation. **Results:** Out of 30 patients in each group, 4 patients (13.3%) in the IVTXA group developed seroma, while 26 patients (86.7%) in the Without TXA group developed seroma. This difference was statistically significant with p-value=0.0021. The risk of seroma formation is 0.22 times lesser in patients with intravenous tranexamic acid as compared to patients without tranexamic acid (RR=0.22, 95% CI: 0.12-0.91). **Conclusions:** IVTXA may be effective in preventing seroma formation after umbilical and paraumbilical hernioplasty.

INTRODUCTION

Umbilical and paraumbilical hernias are prevalent conditions affecting a significant proportion of the global population [1]. The incidence of these hernias is characterized by abdominal tissues protruding through the skin surrounding the umbilicus, and surgical intervention through hernioplasty is a common treatment modality [1, 2]. Seroma formation is one of the most common complications that arise after umbilical and para umbilical hernioplasty, affecting 6% to 42% of the cases [3]. A seroma is an accumulation of fluid that develops in the surgical site after the procedure. The accumulation of fluid can cause discomfort, pain, and delay in wound healing [4]. The prevention of seroma formation is therefore considered to be an important aspect of the post-operative care of hernioplasty patients [3, 4]. Tranexamic acid (TXA) has considered as a favorable prophylactic medium for

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seroma prevention following hernioplasty [3-6]. As an antifibrinolytic agent, TXA inhibits the breakdown of fibrin, a crucial protein involved in blood clotting [4, 5]. The administration of TXA has demonstrated the significant reduction in blood loss and the necessity for the transfusion of blood during the operations and surgeries. Several studies have investigated the role of intravenous tranexamic acid (IVTXA) in preventing seroma formation after umbilical and paraumbilical hernioplasty. These studies have reported promising results, with a significant reduction in seroma formation observed in patients who received IVTXA compared to those who did not [3-6]. Lashari *et al.*, found that proportion of seroma formation was lower in patients who received as compared to patients who had not received TXA (9% vs 16%) [4]. Additionally, Ahmed *et al.*, reported that TXA administration led to a subsidence of seroma in 81% of patients within 5 days after only mesh repair surgery [5].

The aim of this paper was to evaluate the role of IVTXA in the prevention of seroma formation after umbilical and paraumbilical hernioplasty. This was an important topic, as the prevention of seroma formation can significantly improve the post-operative outcomes of hernioplasty patients. The findings of this paper have important implications for clinical practice, and could potentially lead to the development of new guidelines for the management of hernioplasty patients in Pakistan.

METHODS

It was a cohort study conducted at the Department of Surgery, Kulsoom Bai Valika Hospital, Karachi, Pakistan from Oct 2022 to Apr 2022. Sample size of 28≈30 in each group was estimated using Online Open epi sample size calculator by taking proportion of seroma formation in TXA group as 14.9% and without TXA group as 65.7%, power of test as 90% and confidence level as 99% [6]. Patients aged 18 years or above who underwent umbilical and paraumbilical hernioplasty of either gender were included in the study. Patients with a history of bleeding disorders or coagulopathies or who received blood transfusions during or after surgery or who underwent emergency hernia repair were excluded from the study. The research abides by the Helsinki Declaration and the institutional ethics review board/ethics review committee approved it prior to the commencement. As per the ethical practices, all the participants of the study granted the informed consent. Patient information such as age, gender, BMI, type of hernia, and comorbidities were gathered. The patients were then categorized into two different groups: exposed group, consisting of patients who received IVTXA, and the unexposed group, comprising of patients who did not receive IVTXA. Both groups were monitored for a duration of three months to identify the incidence of seroma formation. Data were analyzed using SPSS version 25.0. Mean and SD were computed for age and BMI, whereas, frequency and percentage were computed for gender, type of hernia, and comorbidities. Comparison between exposed and unexposed groups was done using Pearson's chi-square/Fisher exact test for gender, comorbid, type of hernia and seroma formation. While, independent samples t-test was used to compare age and BMI between groups. A p-value ≤0.05 was considered as statistically significant.

RESULTS

The table 1 presents the characteristics of the two groups i.e. IVTXA (n=30) and without TXA (n=30) and their comparison. The mean age of patients in the IVTXA group was slightly higher (36.83 ± 6.94) than that of the Without TXA group (35.30 ± 6.69), but the difference was statistically insignificant (p=0.388). The mean BMI was higher in the IVTXA group (41.60 ± 8.11) compared to the Without TXA group (38.67 ± 7.60), but this difference was statistically insignificant (p=0.154). There were more female patients in the IVTXA group (56.7%) than the Without TXA group (33.3%), but this difference was statistically insignificant (p=0.069). Correspondingly, no significant differences were observed in the proportion of patients with diabetes (p=0.774) or hypertension (p=0.317) between the two cohorts. The most significant difference between the two groups was observed in the type of hernia. A majority of patients in the IVTXA group had umbilical hernias (83.3%) compared to the Without TXA group (26.7%), whereas a majority of patients in the Without TXA group had para umbilical hernias (73.3%) compared to the IVTXA group (16.7%). This difference was statistically significant (p=0.001), indicating that the groups were not evenly distributed with respect to the type of hernia.

Table 1: Comparison of baseline characteristics between groups

Characteristics	Group		p-value
	IVTXA (n=30)	Without TXA (n=30)	
Age in years	36.83±6.9	35.30±6.69	0.388
BMI (kg/m2)	441.60±8.11	38.67±7.60	0.154
Gender			
Male	13 (43.3%)	20 (66.7%)	0.069
Female	17 (56.7%)	10 (33.3%)	
Diabetes			
Yes	9 (30%)	8 (26.7%)	0.774
No	21 (70%)	22 (73.3%)	
Hypertension			
Yes	7 (23.3%)	4 (13.3%)	0.317
No	23 (76.7%)	26 (86.7%)	
Type of hernia			
Umbilical	25 (83.3%)	8 (26.7%)	0.001*
Para umbilical	5 (16.7%)	22 (73.3%)	

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The table 2 shows the occurrence of seroma formation in two groups: IVTXA (patients who received intravenous tranexamic acid) and Without TXA (patients who did not receive tranexamic acid). Out of 30 patients in each group, 4 patients (13.3%) in the IVTXA group developed seroma, while 26 patients (86.7%) in the Without TXA group developed seroma. The p-value is 0.0021, indicating a statistically significant difference in the occurrence of seroma between the two groups. Moreover, the risk of seroma formation is 0.22 times lesser in patients with IVTXA as compared to patients without TXA (RR=0.22, 95% CI: 0.12-0.91).

Table 2: Comparison of seroma formation between groups

Seroma Formation	Group		p-value	RR (95% CI)
	IVTXA (n=30)	Without TXA (n=30)		
Yes	4 (13.3%)	18 (60%)	0.0021*	0.22 (0.08-0.57)
No	26 (86.6%)	12 (40%)		

DISCUSSION

There has been a surge of interest in the use of TXA in surgical operations to minimize bleeding and enhance patient outcomes in recent years [7-13]. The method through which TXA inhibits seroma development is unknown [14-17]. TXA, on the other hand, has been proposed to minimize seroma production by reducing local inflammation and fibrin deposition [4, 5, 7, 14]. In this study, we also looked at the role of IVTXA in preventing seroma development following umbilical and paraumbilical hernioplasty. In this study, the baseline characteristics of the groups of IVTXA and without IVTXA were identical on the basis of age, gender, BMI, and comorbidities. The most significant difference between the two cohorts was seen in the kind of hernia, with umbilical hernias being the most common in the IVTXA group and paraumbilical hernias being the most common in the non-TXA group. This difference was statistically significant, showing that the hernia types were not uniformly distributed across the groups. Almost similar findings were observed in the previous studies [3-6]. Seroma formation is a frequent consequence of hernioplasty, and preventing it is critical to achieving a good result [11, 18-20]. We discovered that IVTXA can help avoid seroma development following umbilical and paraumbilical hernioplasty. The RR of developing seroma in the IVTXA group compared to the non-TXA group found to be 0.22, indicating a substantial decrease in the risk of seroma development in IVTXA patients. In a comparable study, Lashari *et al.*, found that the proportion of seroma was higher in the non TXA group compared to the TXA group (15.6% vs. 8.9%). This difference, however, was statistically insignificant (p>0.05), which might be attributed to their study's lower sample size [4]. According to Zubair *et al.*, the TXA group had a significantly smaller proportion of seroma development (15%) than the non-TXA group (66%) [6]. According to Ahmed *et al.*, TXA therapy caused seroma to disappear in 81% of patients within 5 days, whereas it took longer in 19% of patients [5]. Similarly, Poeran *et al.*, discovered that the TXA group had a lower proportion of seroma production than the non-TXA group (27% vs. 37%), conversely the difference was statically insignificant (p-value=0.200) [21]. However, Albatanony *et al.*, found no significant impact of TXA on post-surgery seroma development [3]. Overall, this findings and other studies point to IVTXA as a potential strategy to reduce seroma development during hernioplasty.

CONCLUSIONS

IVTXA may be effective in preventing seroma formation after umbilical and paraumbilical hernioplasty.

Authors Contribution

Conceptualization: IJ, MG
Methodology: MG, MA
Formal Analysis: WNZ, RW, ZA, KA
Writing-review and editing: SAAZ, ZA, KA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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