

Original article:

Comparison of the post-operative response of tumor necrosis factor - α and Interleukin- 6 in Inguinal hernioplasty

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ABSTRACT:

BACKGROUND: Inguinal hernia is the commonest groin swelling. Some of the common predisposing factors to inguinal hernia are: COPD, BPH, Chronic constipation. This study aims to determine the post-operative significance of Interleukin-6 (IL-6) and Tumor Necrosis Factor- α (TNF- α) following open and laparoscopic-TEP repair inguinal hernioplasty in the detection of tissue trauma.

MATERIALS AND METHODS: This study was conducted in the department of General Surgery from January 2017- June 2018 in Justice K.S Hegde Charitable Hospital. The post-operative response of IL-6 and TNF- α was assessed among 40 patients undergoing open and laparoscopic-TEP repair inguinal hernioplasty. Mann-Whitney U test was used and the p-Value of <0.05 is considered statistically significant.

RESULTS: The post-operative rise in TNF- α following laparoscopic hernioplasty was statistically significant when compared to the open procedure (Unilateral hernioplasty: p-Value- 0.04 and Bilateral hernioplasty: p-Value- 0.009). No significant change was noted in IL-6 (Unilateral hernioplasty: p-Value – 0.65 and Bilateral hernioplasty: p-Value – 0.29)

CONCLUSION: The post-operative change in TNF- α was considered significant when compared to IL-6. Thus, showing that TNF- α is a more reliable indicator of tissue trauma.

INTRODUCTION:

A hernia is defined as the disruption/weakness in the fibromusculature of the body wall leading to abnormal protrusion of the viscus / part of the viscus through an opening with a sac enclosing it. Inguinal hernia constitutes 73% of all the groin swellings¹. Indirect hernia is common among men and women². The common laparoscopic repairs performed are TEP and TAPP repair. The different types of open repair are Lichtenstein Tension Free hernioplasty, Modified Rives- Stoppa pre-peritoneal mesh repair; NYHUS pre-peritoneal mesh repair, Stoppa's GPRVS repair. In our study, we have performed Lichtenstein Tension Free hernioplasty and laparoscopic TEP repair (Unilateral as well as Bilateral). The parameters used in our study are serum TNF- α & IL-6, obtained 6 hours after either of the procedure. Tumor Necrosis Factor- α is a pro-inflammatory cytokine from the Golgi complex of Macrophages, T- lymphocytes and dendritic cells³. Interleukin-6 is a pro-inflammatory cytokine with a half-life of 6 hours. A potent inducer of CRP and Fibrinogen from the Hepatocytes. It modulates the lymphocytic response of antibody production and cell-mediated immunity⁴.

MATERIALS AND METHODS:

Our study is a Prospective study (Institutional Ethics Committee approval obtained in October 2016) conducted in the period of January 2017- June 2018 in the department of General Surgery, Justice K.S Hegde Charitable Hospital. Patients undergoing open or laparoscopic (Unilateral and Bilateral) inguinal hernioplasty on an elective basis. Total of 40 subjects were involved in the study- the study population was further divided into 10 open U/L

inguinal hernioplasty, 10 open B/L inguinal hernioplasty, 10 laparoscopic U/L inguinal hernioplasty, 10 laparoscopic B/L inguinal hernioplasty.

After 6 hours of either procedure, the blood was drawn from the patient after obtaining due consent from the patient. TNF- α and IL-6 was analysed using DIACLONE™ Human ELISA kits. The study excluded patients with auto-immune disease such as SLE; RA. Obstructed/Strangulated hernia. Patients undergoing TAPP repair.

The statistical analysis was done using Microsoft Excel 2010 version 14 Software and SPSS 22.0 (SPSS Inc.Chicago.II,USA). Mann-Whitney-U test was used and the p-Value of ≤ 0.05 was considered significant.

RESULTS:

Table-1: Comparison of post-operative TNF- α : Open Vs Laparoscopic Inguinal hernioplasty:

Inguinal Hernioplasty	Median Post-op TNF- α	Inter-Quartile Range	p-Value ≤ 0.05 , significant
Open U/L	43.7	(22.4-81)	0.04
Laparoscopic U/L	62.5	(40.5-81.1)	(Significant)
Open B/L	37.33	(30.5-48.4)	0.009
Laparoscopic B/L	66.4	(49.9-68.13)	(Significant)

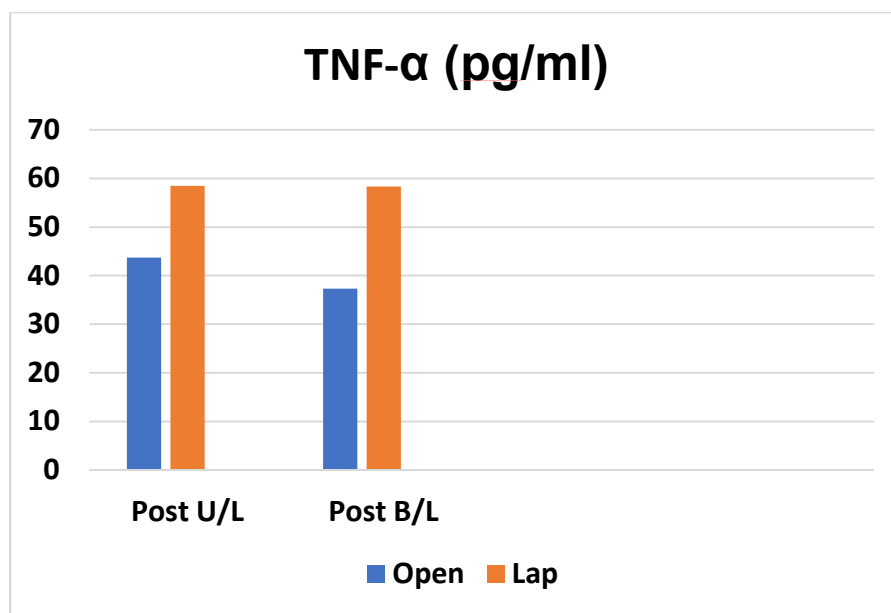


Figure-1 : Comparison of Post operative TNF- α between open and Laparoscopic inguinal hernioplasty.

Table-2: Comparison of post-operative IL-6: Open Vs Laparoscopic Inguinal hernioplasty :

Inguinal Hernioplasty	Median Post-op IL-6	Inter-Quartile Range	p-Value ≤ 0.05,Significant
Open U/L	52.95	(44.5-62)	0.65 (Not significant)
Laparoscopic U/L	55.25	(44.3-75)	
Open B/L	58.78	(45.5-70)	0.29 (Not significant)
Laparoscopic B/L	73.89	(48.5-81)	

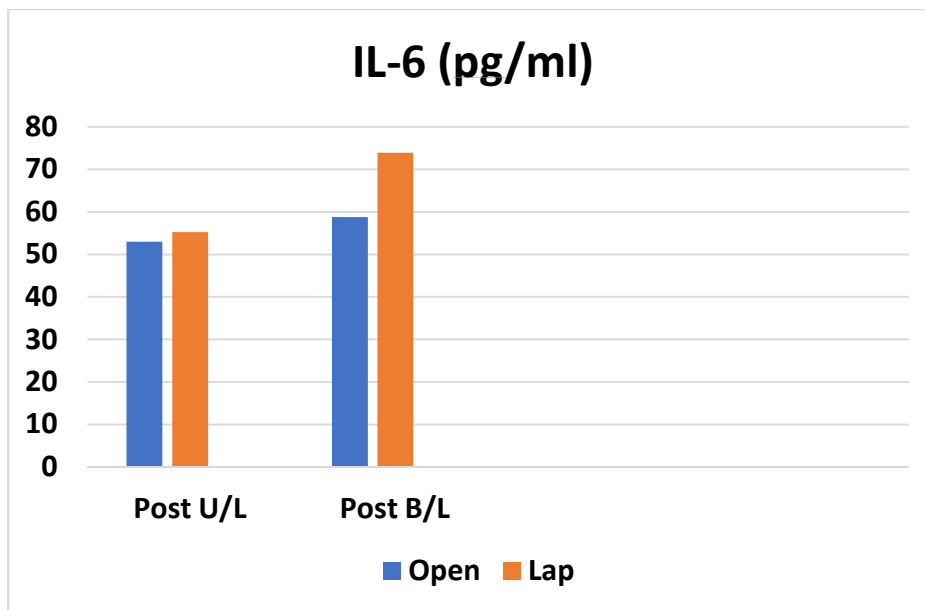


Figure-2: Comparison of Post operative IL-6 between open and laparoscopic inguinal hernioplasty.

DISCUSSION:

Our study compares the response of TNF- α and Interleukin-6 in post-operative status. This study excludes patients with auto-immune diseases and obstructed Inguinal hernia- the condition in which there is rise of acute inflammatory mediators before the intervention⁴ and patients undergoing TAPP repair, as its not frequently performed compared to TEP repair at our institution.

Prospective study conducted by Schrenk.P et al ⁵ on ‘ Metabolic responses after laparoscopic and open hernia repair comprised of 15 patients in each group. The parameters compared were TC, IL-6, TNF- α , CRP. The p-value of <math>< 0.05</math> was considered significant. The changes in TC, DC, CRP, TNF- α , IL-6 were not significant, where as our study shows a significant rise in TNF- α in the group subjected to laparoscopic Inguinal hernioplasty.

In 2002 Suter M et al ⁶ conducted a prospective study on ‘ Reduced acute phase response after laparoscopic (TEP repair) compared with open repair’ .The study had 39 patients in both groups. The inflammatory mediators assessed were TC, Neutrophils, Lymphocytes, CRP, IL-6 and TNF- α . The p-Value of ≤ 0.05 was considered to be significant. The study, showed a significant decrease in the lymphocyte count (p-Value= 0.04) and a significant rise was noted in IL-6 (p-Value=0.05) following open Inguinal hernioplasty. No significant changes were noted in TC, Neutrophils, CRP and TNF- α respectively.

In our study, the change in TNF- α in laparoscopic Inguinal hernioplasty for unilateral hernia repair (p-value=0.04) and bilateral hernia repair (p-Value=0.009) was considered significant on comparing it with its open counterpart, whereas IL-6 showed no significance between open and laparoscopic Inguinal hernioplasty.

Akhtar K et al ⁷ in 1998 conducted a prospective study on ‘ Metabolic and inflammatory response after laparoscopic and open hernia repair ‘. The study had sample of 10 patients in each group. The change in CRP,IL-6 and TNF- α was compared between open and laparoscopic inguinal hernioplasty groups. Change in IL-6 levels were not significant. A significant rise was noted in CRP (p-Value <0.006) and TNF- α (p-Value <0.005) among the groups of open hernioplasty group.

In our study, TNF- α was the only mediator to display a significant rise in laparoscopic Inguinal hernioplasty when compared to open Inguinal hernioplasty-Unilateral (p-value=0.04) as well as bilateral (p-Value=0.009) repair. No significance was noted in CRP and IL- 6 were noted among the groups of open and laparoscopic Inguinal hernioplasty respectively.

CONCLUSION:

The post-operative change in TNF- α was considered significant when compared to IL-6. Thus, showing that TNF- α is a more reliable indicator of tissue trauma.

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