



EVALUATION OF OPEN VS LAPAROSCOPIC APPENDICECTOMY BASED ON STRESS MARKERS

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**ABSTRACT**

**Background-** The surgical stimuli are one of the external stimuli for stress. If external stimuli are more, the stress response is also more, which leads to delay in recovery of patient post operatively. In this study I am going to prove that the newly evolved laparoscopic procedure had minimal stress response compared to conventional open surgical procedure. **Methods-** The study group of 100 patients was divided in to 2 groups. Each group containing 50 patients - open surgical procedure and laparoscopic procedure for acute appendicitis. The preoperative and post operative laboratory values of serum cortisol, glucose and CRP are analyzed for the statistical significance and correlation. **Results-** Post-operative laparoscopic group has much less stress response compared to open surgical group with P value less than 0.05. **Conclusion-** the recently advanced laparoscopic surgical procedure was best procedure with less stress, less pain, less anxiety, early recovery from hospital stay and economic to the patient.

**KEYWORDS :** acute appendicitis, Open surgical procedure, laparoscopic procedure, stress response

**INTRODUCTION**

Laparoscopy is the newly evolved surgical procedure which allows the surgeon to access the abdomen and pelvis without making the larger incision in the skin.

The laparoscopic surgery is also called keyhole surgery or minimal access surgery. In conventional open surgical procedure because of larger incision and more handling of internal organs, the patient has increased stress level, increased level of pain, and long recovery time. Stress is the biological response by the body stimulated by external and internal stimulus, which leads to activation of endocrine and autonomic nervous system to handle the situation.

During stress cortisol is released in larger amount for various direct and permissive actions to handle the stress situation. The surgical stimuli are one of the external stimuli for stress. If external stimuli are more than the stress response is also more, which leads to delay in recovery of patient post operatively. In this study I am going to prove that the newly evolved laparoscopic procedure had minimal stress response compared to conventional open surgical procedure.

**AIM OF THE STUDY**

1. To determine the less stress full procedure between open and laparoscopic surgeries. 2. To determine whether the less stress full procedure has less postoperative pain. 3. To determine whether the less stress full procedure having better wound healing. 4. To determine whether the less stress full procedure having short post operative recovery time.

**MATERIALS AND METHODS**

**Study Group** - Patient admitted in general surgical wards having acute appendicitis.

**Study Design** - PROSPECTIVE STUDY

**Place of Study** - Department of General Surgery, Raja muthiah Medical College and Hospital, Chidambaram.

**Duration of Study** - 2 years

**Sample Size** - PATIENTS - 100 (Open surgeries - 50 & laparoscopic surgeries - 50)

**METHODOLOGY**

**Inclusion Criteria:**

Patient in the age group of above 18 years and below 45 years. Patient proven to have acute appendicitis undergoing open and laparoscopic procedures with duration of surgery less than 2 hours.

**Exclusion Criteria**

Patient having diabetes, hypertension, asthma, tuberculosis, epilepsy, and psychiatric disorder. Patient on any drugs for chronic illness. Patient positive for HIV, HbsAg, and Anti HCV

**Data Collection**

**STUDY VARIABLES**

- Serum Cortisol
- Serum Glucose
- CRP

The blood sample of patient was collected at the time admission for preoperative analysis of serum cortisol, glucose and CRP Post operatively the blood samples are collected 6hrs after surgery for analysis of serum cortisol, glucose and CRP. The preoperative and post operative laboratory values are analyzed for the statistical significance and correlation.

**Data Analysis**

**Table 1**

S.NO	PROCEDURE DONE	NO. OF PATIENTS
1	Open Appendicectomy	50
2	Lap Appendicectomy	50

**Table 2 – Sex Distribution**

S.NO	PROCEDURES	MALE	FEMALE
1	Open surgical procedure	33	17
2	Laprosopic procedure	28	22

**Table 3 – Age Distribution**

S.NO	PROCEDURES	TOTAL	AGE 18-30YRS	AGE 31 – 45 YRS
1	Open Appendicectomy	50	14	36
2	Lap Appendicectomy	50	16	34

**Table 4 – Procedure Time**

S.NO	PROCEDURES	BELOW 1HR	ABOVE 1 HR
1	Open Appendicectomy	17	33
2	Lap Appendicectomy	10	40

**Table 5 - Comparison of Pre – Operative Cortisol Levels Among The Study Groups**

Surgical procedures	Preoperative Glucose		T test	P value
	MEAN	S.E.		
Open procedure	92.84	1.8	-0.388	0.699
Laprosopic procedure	93.72	1.4		

**Table 6 - Comparison of Pre – Operative Glucose Levels Among The Study Groups**

Surgical proedures	Preoperative Glucose		T test	P value
	MEAN	S.E.		
Open procedure	92.84	1.8	-0.388	0.699
Laprosopic procedure	93.72	1.4		

**Table 7 - Comparison of Pre – Operative Crp Levels Among The Study Groups**

Surgical procedures	Preoperative CRP		T test	P value
	MEAN	S.E.		
Open procedure	4.85	0.2	-1.186	0.238
Laprosopic procedure	5.14	0.1		

**Table 8 - Comparison of Post – Operative Cortisol Levels Among The Study Groups**

Surgical procedures	Post operative cortisol		T test	P value
	MEAN	S.E.		
Open procedure	801.60	33.5	5.697	0.0001
Laprosopic procedure	581.76	19.1		

**Table 9 - Comparison of Post – Operative Glucose Levels Among The Study Groups**

Surgical procedures	Post operative Glucose		T test	P value
	MEAN	S.E.		
Open procedure	140.18	4.3	5.523	0.0001
Laprosopic procedure	111.0	3.1		

**Table 10 - Comparison of Post– Operative Crp Levels Among The Study Groups**

Surgical procedures	Post operative CRP		T test	P value
	MEAN	S.E.		
Open procedure	10.16	0.5	6.477	0.0001
Laprosopic procedure	6.62	0.2		

**Table 11 - Comparison of Duration of Hospital Stay Among The Study Groups**

Surgical procedures	Hospital stay durations		T test	P value
	MEAN	S.E.		
Open procedure	7.12	0.5	5.337	0.0001
Laprosopic procedure	4.00	0.3		

**Table 12 - Comparison of Post Operative Wound Infection Among The Study Groups**

Surgical procedures	Post operative wound infection		T test	P value
	MEAN	S.E.		
Open procedure	19	31	14.92	0.0001
Laprosopic procedure	3	47		

**DISCUSSION**

In our prospective study of stress response in open and laparoscopic procedure, 100 patients are included in study group. There is male preponderance in the study group. To avoid the wide variation of stress response in extremes of age, in our study I included middle aged patients between the age group of 18 and 45 years. Most of the patients fall under the category of above 30 yrs of age. To avoid stress response due to variation in duration of surgery, the duration of surgery in our study kept as constant. That is the patients undergoing surgery with procedure time less than 2 hrs are included in our study. Most of the patients fall under the category of surgical procedure duration more than 1 hr. To measure the preoperative basal level of cortisol, glucose and CRP was measured by collecting the blood sample from the patients included in the study group at the time of hospital admission. The mean preoperative cortisol was found to be 305.80 nm/l in open surgical procedure and in laparoscopic group it was found to be 399.52 nm/l. By comparing the preoperative cortisol level between two groups we found that the mean cortisol level in laparoscopic group was found to be higher. The difference is statistically significant, it has the P value of 0.001 (less than 0.05). Even though the preoperative mean cortisol level shows statistically significant difference, the difference may be due day night variation of cortisol level. The mean post operative rise in cortisol was found to be higher in laparoscopic group. The mean post operative cortisol level in open surgical group was found to be 801.60nm/l and in laparoscopic group it was found to be 581.76. when compared to preoperative cortisol level the post operative cortisol in laparoscopic group was much less compared to open group. The change in cortisol level is also statistically different, with the P value of 0.0001 (less than 0.005). The mean preoperative serum glucose level in open surgery was 92.84 mg/dl and in laparoscopic group was 93.72. By comparing these preoperative mean glucose level there is not much difference. The difference is also statistically not significant with P value of 0.699. (Not less than 0.05). The mean post operative serum glucose level in open surgical group was 140.18mg/dl and in laparoscopic group was 111mg/dl. The laparoscopic group has less rise in serum glucose when compared to open surgical group. It is also statistically significant with P value of 0.0001 (p value less than 0.05). The mean level of preoperative CRP level in open group was 4.85mg/l and in laparoscopic group was 5.14 mg/dl. The preoperative difference mean CRP between two groups was statistically insignificant with P value of 0.238 (not less than 0.05) Surgery is associated with metabolic and endocrine responses characterized by hyper glycemia, increase in ACTH, cortisol, prolactin, ADH, and a decrease in insulin. When human is exposed to any of an immense variety of noxious or potentially noxious stimuli, there is an increased secretion of ACTH and consequently a rise in the circulatory glucocorticoid's levels. This rise is essential for survival.

Schauer PR. et al [5] found that plasma concentration of glucose and cortisol increased after surgery (cortisol level increased 1.9 times in open surgery and 1.2 times following lap surgery) in both the groups, being more in open surgery than in lap surgery, which was comparable to our study.

**CONCLUSIONS**

In our study of 100 patients, by comparing the open surgical and laparoscopic group based on stress markers, the laparoscopic group shows the less stress activity to surgery among two groups. The patients undergone laparoscopic surgery also shows early fast recovery post operatively and less change of surgical site wound infection when compared to the open surgical group. By comparing the preoperative level of cortisol, glucose, and CRP in open surgical and laparoscopic group there is not much difference between the two groups. The preoperative P value for the cortisol, CRP and

glucose are not less than 0.05. It indicates there is no significant difference between the two preoperative groups statistically. By comparing the post operative level of cortisol, glucose and CRP, the laparoscopic group has much less stress activity compared to open surgical group with P value less than 0.05. From our study I conclude that the recently advanced laparoscopic surgical procedure was best procedure with less stress, less pain, less anxiety, early recovery from hospital stay and economic to the patient.

## REFERENCES

1. Bozkurt P, Kaya G, Altintas F, et al. Systemic stress response during operations for abdominal pain performed via laparoscopy or laparotomy in children. *J. Anaesth* 2000; 55: 5-9.
2. Kehlet H. Surgical stress response: does endoscopic surgery confer an advantage? *World J Surg.* 1999; 23: 801-7.
3. Makri GG, Karayiannakis AJ, Mantzioka A, Karousos D, Karatzas G. Systemic stress response after laparoscopic or open cholecystectomy: a randomized trial. *br J Surg.* 1997; 84: 467-71.
4. Haque Z, Rahman M, Siddique Ma, et al. Metabolic and stress responses of the body to trauma: produced by the laparoscopic and open cholecystectomy. *mymensingh med J.* 2004; 13: 48-52.
5. Schauer Pr, Sirinek Kr. The laparoscopic approach reduces the endocrine response to elective cholecystectomy. *J. am Surg.* 1995; 61: 106-11.
6. Muzii L, Marana R, Marana E, Paielli Fv, Meo F, Maussier Ml, Sciarra M, Mancuso S. Evaluation of stress-related hormones after surgery by laparoscopy or laparotomy. *J Am Assoc Gynecol Laparosc.* 1996; 3: 229-34.
7. Akhtar K, Kamalky-Asl Id, Lamb Wt, Laing I, Walton I, Pearson RC, Parrott Nr. Metabolic and inflammatory responses after laparoscopic and open inguinal hernia repair. *ann r Coll Surg engl.* 1998; 80: 125-30.
8. Mansour MA, Steigmann G.V, Yamamoto M. et Al. Neuroendocrine response after minimally invasive surgery in pigs. *Surg endosc* 2006; 6: 294-7.