ORIGINAL ARTICLE

Effectiveness of fast tract surgery protocols in patients undergoing appendicectomy. A pragmatic trial

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Abstract

Objective: To determine the effectiveness of fast track surgery protocols in patients undergoing appendicectomy both open and laparoscopically.

Materials and methods: This study was conducted in surgical department of Khyber Teaching hospital, Peshawar from January 2018 to June 2018. Total 154 patients were included in this study. They were randomized in two groups, by lottery method. Group-I (interventional) and group-II (controlled) group. All patients both male and female with age range of 18 to 60 years, who presented with acute appendicitis without any complications, were included. While those with co-morbidities like diabetes mellitus and ischemic heart disease were excluded. Patients were clinically evaluated after informed consent and kept nil by mouth 6 hours before surgery, following a glass of fluid containing sugar. After surgery they were allowed orally within 4-6 hours and mobilized within 6 hours of surgery as well. Injection Ondansetron for controlling post-operative nausea and vomiting. Infusion paracetamol alone in majority of the patients while in some of the cases paracetamol with non-steroidal anti-inflammatory drugs in combination were used to control post-operative pain. All patients were reviewed on 9th-10th post-operative day for stitch removal and any other possible complication.

Results: A total of 154 patients were enrolled in this study. Mean age was 22.4±6.31 years. Among them 66(43.14%) were female and 88(56.86%) male. Mean duration for pre-operative fasting was 9.78±4.62. Mean durations for first fluid intake were 8.38±6.31 hours and first solid intake 15.53±9.47 hours. Mean duration for first mobilization was of 13.56±8.39 hours. Effective analgesia was obtained with only paracetamol infusion in 81.9% of patients while combined analgesia using ketorolac and paracetamol infusion in 18.1% of patients. Post-operative nausea and vomiting were effectively controlled with injection Ondansetron. 69.74% of patients were having no post-operative complications. In rest of the patients 10.53% were having wound site pain, 3.95% wound infection and 15.78% post-operative nausea and vomiting. Mean hospital stay was 1.3 days (p-value <0.001).

Conclusion: Fast track surgery protocols enhances post operative recovery, shortens hospital stay without increasing post-operative complications. Further studies are needed in other surgical diseases, to see the effects of fast track protocols.

Keywords: Fast track surgery, Enhanced recovery after surgery, laparoscopic appendectomy, open appendectomy

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Introduction:

Fast track protocols reduces stress response resulting in improved functions of the organs and hence shortens the post-operative recovery, hospital stay and less post-operative complications. Following injury /trauma different metabolic, hormonal and immunological changes occur and they are given the name of surgical stress response. The response to trauma is graded, the more severe the injury, the greater the response.[1]

All those patients who undergo surgical inter-

vention, experience surgical stress response which is responsible for the changes in the organ functions.[2] These changes are responsible for the development of gastro-intestinal dysfunction and ileus, cardio-pulmonary complications, infection, hypoxemia and thrombo-embolic complications.[3,4] These complications may hinder recovery and prolong hospital stay. Improvement in surgical techniques, development of minimally invasive surgery and improved peri-operative care minimizes surgical stress response resulting in better outcome.[2]

In 1990 Henrik Kehlet initiated fast track surgery. It's a multi-disciplinary approach which reduces surgical stress response and organ dysfunction and expedites post-operative recovery.[5,6] It includes various methods applied in the peri-operative care of the patients, to optimize patient condition for surgery, improved anesthetics, post-operative analgesia, early mobilization with early oral feeding, to expedite post operative recovery for faster discharge from the hospital and early resumption of daily activities with safety.[7,8] This integrated approach reduces surgery related psychological and physiological stresses with improved tissue catabolism.[8]

In recent years because of its significant benefits and safety, fast track surgery has been applied to different fields of surgeries like cardiac surgery, radical prostatectomy and colorectal surgeries.[9]

We performed this study to analyze the effectiveness of fast track surgery in patients undergoing appendicectomy both open and laparoscopically in our set up.

Materials and Methods:
This study was carried out in Department of Surgery, Khyber Teaching Hospital Peshawar. Study design was Pragmatic trial

This study was carried out for a period of six months from January 2018 till June 2018.

Sample size was collected using open epi sample size calculating software. taking: Power (1-beta, % chance of detecting) that comes to be, 80 patients.

A total sample size (n) was 154 patients i.e. 77 in each group

Sample technique was non-probability consecutive sampling

All patients both male and female in the age range of 18-60 years who presented with acute appendicitis without any complication were included. All those patients who presented with co-morbidities like diabetes, ischemic heart disease were excluded.

Data collection procedure: The study was conducted after the approval from the institutional research and ethical board. According to the inclusion criteria all patients were admitted through outpatient/ emergency departments. Patients were randomized into two groups by allotment of first patient through lottery method followed by allocation of consecutive patients to each group in an alternate manner.

Detailed written informed consents were taken from the patient after having explained the purpose of study and ensuring their confidentiality. Complete history and physical examination were done and investigations including full blood count, liver function tests, viral serology, abdominal ultrasound, x-ray chest and ECG where indicated were performed. Patients were instructed to take oral fluids containing sugar and intravenous injection metoclopromide given and then asked to stop oral intake six (06) hours before surgery. A dose of antibiotics was given at the time of induction. Procedure was performed under general anesthesia. Where possible procedure was performed laparoscopically while in rest of the cases open procedure was adopted. Intra-operative salt, water overload and hypothermia were avoided. Post-operatively patients were started on injection Ondansetron to avoid nausea and vomiting. For pain control infusion paracetamol/ketorolac after every 8 hours were used instead of narcotic analgesics. Patients were mobilized and orally allowed within the first 4-6 hours. Drains, Nasogestric

Table-1:

Sex	Interventional	Control	Chi Square p value
Male	43 (55.84)	45 (58.44)	0.691
Female	34 (44.16)	32 (41.56)	
Total	77 (100)	77 (100)	

Table-2:

Variable	Mean	Standard deviation
Age	22.4	6.31
Pre operative fasting (Hours)	9.78	4.62
Duration of surgery (Min)	43.26	17.12
Post operative fluid intake (Hours)	8.38	4.44
First Solid intake (Hours)	15.53	9.47
First mobilization (Hours)	13.56	8.39

Table-3:

Variable	Interventional group		Controlled group	
	Frequency	Percent %	Frequency	Percent %
Wound site pain	08	10.39	18	23.38
Wound site infection	03	3.89	10	12.98
PONV	12	15.59	25	32.47
Paralytic ileus	0	0	0	0

tube and catheters were avoided and where necessary were removed within first 24 hours.

Patients were kept under observation in the ward for 24 hours and then discharged home. All patients were followed on 9th or 10th post -operative day for stitch removal and any possible complication.

All the above mentioned informations were recorded in a pre designed proforma.

Results:

This study was conducted in surgical "C" unit of Khyber Teaching Hospital Peshawar for six months from January 2018 to June 2018. All those patients' between18-60 years of age who presented to surgical OPD/emergency with acute appendicitis were enrolled. A total of 154 patients were included in this study. Out of 154 patients, 66(43.14%) were female and 88(56.86%) male. See table no. 1

The mean age of the patients presented with acute appendicitis was 22.4 ±6.31 years.

All patients were divided into two groups. Group-I (interventional group) and group-II (controlled group). All patients were kept nil by mouth before surgery in range of 4-24 hrs, with a mean duration of 9.78±4.62. All of them were operated under general anesthesia. The total duration of surgery observed with mean of 43.26±17.12 minutes. Intra-operatively it was observed that appendices were catarrhal in 79.87%(123), Phlegmonous in 16.88%(26) and gangrenous in 0.065%(1) of patients in both groups.

The time duration until the first post-operative fluid intake was in range of 4-12hrs with a mean duration of 8.38±4.44 hours, the time until the first solid intake was in range of 6-24 hours and with a mean 15.53±9.47 hours.

After the surgery patients were mobilized in range of 6-24 hours, with mean of 13.56±8.39 hours later. It was found that longer the first post-operative mobilization time, longer the patient's stay in the hospital after the surgery as shown in table 2.

It was found that in 81.9% of patient effective analgesia was obtained with paracetamol infusion only and in 18.1% with combined analgesics (ketorolac and paracetamol infusion) in group-I while injection diclofenac sodium or injection tramadol in group-II.

In group-I injection Ondansetron were administered in all patients, which effectively controlled post-operative nausea and vomiting. Only 15.59%(12) of patients had post-operative nausea and vomiting (PONV) which were controlled with repeated dose of Ondansetron and steroids. While in group-II 32.47%(25) of patients had post-operative nausea and vomiting which were treated with injection dimenhydrinate /metoclopromide. All these differences after 24hrs of follow-up in the two groups were statistically significant (p-value <0.001).

After 24 hrs of follow-up there were gross differences in status of patients in both groups i.e.

70.13%(54) in group-I were completely normal (having no complication), on the other hand 31.17%(24) in the group-II were normal i.e. absence of any complication. Only 10.39%(8) in group-I and 23.38% (18) in group-II had wound site pain after 24hrs of follow-up.

Surgical site infections were observed in only 3.89% (3) in group-I and 12.98% (10) in group-II and these differences were statistically significant (p-value =0.04). None of them had either stump disruption or paralytic ileus in both groups as shown in table 3

There was significant difference (p-value <0.001) in total hospital stay between the two groups. Individuals in group I (mean hospital stay =1.3 days) stayed 1.6 days less than group II (mean hospital stay = 2.9 days.

Discussion:

Patho-physiological response to surgery is the main culprit responsible for post-operative complications. The progressive understanding of physiological response to surgery has resulted in the development of fast track surgery protocols, in order to minimize the surgical stress response and improve the outcome. Fast track surgery is an integrated, multi-professional and multi-disciplinary approach.[10] This approach results in faster recovery from all kind of surgeries even major and complicated surgeries.

Pre-operative patient's health optimization is one of the preliminary components of fast tract protocols which improve post-operative recovery.[11] Patient is evaluated in the pre-operative period regarding the risk factors which may lead to organ dysfunction in the post-operative period. Patient's health is optimized in the pre-operative period is beneficial[12] which reduces the surgical stress response and shortens the hospital stay.

Oral carbohydrate loading and avoidance of prolonged fasting in the pre-operative period reduce insulin resistance with resulting reduced surgical stress response and improved outcome.[11] Pre-operative fasting results in increased metabolic response which ultimately leads to hyperglycemia and insulin resistance, further aggravates the surgical stress response.[11] In our study solids were stopped 6-hours and fluids 4-hours before surgery with loading carbohydrate containing fluid.ion

Adequate anesthesia and analgesia intra-operatively play an important role in reducing stress response resulting from a surgical intervention.[2] It was found that short acting anesthetics enhanced patient's recovery in the post-operative period. Local anesthesia at the wound site post -operatively provides a range of benefits and establishing highest level of pain management.[4]

Post-operative pain can be managed in a better way with non-opiods (acetaminophen and non-steroidal anti-inflammatory drugs) and local anesthetics.[2] It was observed that acetaminophen and NSAIDs were frequently used in our study. In 81.9% of patients adequate analgesia was obtained with acetaminophen and local anesthetics while in 18.1% combined analgesia (acetaminophen, ketorolac) were effective.

Effective early ambulation is another important component of fast tract surgery protocol which in contrast to traditional prolonged bed rest mostly resulting in fatigue and muscle wasting. To prevent such events aggressive early mobilization is needed.[13] It was determined that early mobilization was with mean of 13.56±8.39 hours later.

It was observed that the mean time until the first fluid intake post-operatively was 8.38±4.44 hours and the mean time until the first solid intake was 15.53±9.47 hours after the surgery. Different studies favor the approach of early oral nutrition which safely and effectively promotes tissue regeneration.[14,15] One meta analysis shows that it is of no use to keep patient hunger for a longer time after gastrointestinal surgery, while early feeding is beneficial by reducing infectious complications and length of hospital stay.[15] It was demonstrated that there is no detrimental effect of early oral feeding but a trend towards a lower incidence of surgery related specific complications.[15] Reduction in morbidity and

mortality rate has been observed in a Cochrane review 2006.[16]

After pain at the wound site, Nausea and vomiting are the major symptoms which really bother the patients in the post-operative period. Apart from other factors opiods and pain are the major factors responsible for PONV. Opiods decrease gastrointestinal motility and delaying gastric emptying.[10] A significant reduction in PONV incidence has been observed with better perioperative pain control.[17,18] It was observed that only 5.26%(4) of patients experienced PONV in our study.

Kuzma et al. reported no significant differences between groups regarding abdominal cramps and other morbidities.[14] A significant difference has been observed in surgical wound site pain 10.53% versus 35.90% and infection rate 3.95% versus 12.82% (p-value =0.04). While regarding abdominal cramps and paralytic difference no significant difference between the groups.

Total length of hospital stay was significantly different between the groups, 1.3 days versus 2.9days (p-value, 0.001). Different studies have shown positive impact of fast tract protocols on total length of hospital stay and patients spent fewer post-operative days in the hospital.[19]

Conclusion:

It is concluded that multi-modal approach of fast track surgery protocols enhances post-operative recovery, reduces medical morbidity and shortens the hospital stay without affecting disease specific morbidity. It should be widely adopted and further studies are needed to see the effects of fast track surgery protocols on other surgical diseases.

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Role and contribution of authors:

Dr Hizbullah Jan, collected the data, references and did the initial write up.

Dr Attaullah khan, collected the data and helped in introduction writing

Dr Anayat, eview the article and advised useful changes in the article

Prof Mah Munir Khan, critically review the article and made further changes

Sayed Mohammad Hamid did the statical analysis.

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