ORIGINAL ARTICLE

Comparison of Time to Recovery of Gastrointestinal function following Gastrointestinal Surgery

FAISAL JAVED[1], MOHAMMAD ABDUL AZIZ[2], ZIA UDDIN AHMED[3], *MAHNOOR ZIA[4]*

ABSTRACT

Background: Gastrointestinal tract Recovery following gastrointestinal surgery is a very important parameter to determine the outcome of gastrointestinal surgery. Gastrointestinal tract dysfunction is the commonest post-operative complication and is the cause of delayed hospital discharge..
Objective: To compare mean time for recovery of gastrointestinal function, in Thoracic Epidural Analgesia and Systemic Opioid Analgesia groups in patients undergoing gastrointestinal surgery.
Study Design: Randomized controlled trial.
Setting: Department of Anaesthesia, Shaukat Khanum Memorial Hospital & Research Centre, Lahore.
Duration of study: 6 months.
Method: 60 cases (30 cases in each group) were included in this study. Group A was given Thoracic Epidural Analgesia whereas group B patients received Systemic Opioid Analgesia.
Results: Mean age was 32.76±5.33 in group A and 31.21±7.84 years in group B. In group A 22 patients (44%) and in group B 24 patients (48.0%) were male while 28 patients (56.0%) in group A and 26 patients (52%) in group B were female. Group A has shown early recovery of gastrointestinal function (time: 42.63±1.86hours) as compared to Group B (time: 79.93±4.73hours). P-value=0.0002 was obtained that was extremely significant.
Conclusion: Thoracic Epidural Analgesia provides early recovery of gastrointestinal function as compared to Systemic Opioid Analgesia in patients undergoing gastrointestinal surgery.
Key words: Gastrointestinal Recovery, Thoracic Epidural Analgesia, Systemic Opioid Analgesia

INTRODUCTION

Every year, all over the world, it is expected that 234.2 million major surgeries are done.[1] Among all surgeries, gastrointestinal surgeries are the commonest surgeries. In postoperative period, gastrointestinal tract dysfunction is commonest morbidity and it causes prolongation of hospital stay.[2] Possible phenomena may be interruption in sympathetic / parasympathetic paths to gastrointestinal tract, inflammatory alterations interceded via different passages and use of analgesics to control postop pain[3].

Efforts in reduction of postoperative ileus duration comprise variables like epidural analgesia and opioid during anaesthesia.[3] Thoracic epidural analgesia (TEA) is shown to speed-up the bowel function restoration within 1-2days and also reduces the opioids requirement than systemic opioids alone.[4] A TEA is required to block significantly these sympathetic passages.[4] TEAs are used extensively in order to avert intra- & post-operative pain.[5] TEA progresses quality of life and delivers better analgesia than patient controlled analgesia after major thoraco-abdominal surgeries[6].

TEA after gastrointestinal surgeries, gives a substantial advantage like less analgesic consumption, quick gastrointestinal recovery having least morbidity than systemic opioid analgesia. The aim of conducting this trial was to compare the effects of TEA vs. Systemic Opioid Analgesia in terms of Gastrointestinal function recovery after Gastrointestinal Surgery. Based on these results, the modality with shorter recovery time may be preferred. As local evidence is lacking, so the results from this study will help us in choosing the best modality in our population.

The objective of the study was to compare mean time for recovery of gastrointestinal function, in Thoracic Epidural Analgesia and Systemic Opioid Analgesia groups in patients undergoing gastrointestinal surgery.

[1]PGR Anesthesia Shaukat Khanum Memorial Hospital Lahore.
[2]Consultant Anesthetist, Indus Hospital, Lahore
[3]Consultant Anesthetist, Indus Hospital, Lahore
[4]4th MBBS student, Lahore Medical & Dental College, Lahore.
Correspondence to Dr. Zia Uddin Ahmed E-Mail:zia61@outlook.com Mobile: 03334264017

METRIAL AND METHOD

This randomized controlled trial was conducted in the Department of Anaesthesia, Shaukat Khanum Memorial Cancer Hospital and Research Centre, Lahore from 06-02-2015 to 06-08-2015. 60 cases sample size (30 in each group) is calculated with 95% confidence interval, 80% power of test with an expected mean time of recovery of gastrointestinal as 2.96±0.2 in TEA group and 3.81±0.3 in Systemic opioid Analgesia group. Non-probability, Consecutive sampling technique was used.

Inclusion criteria

1. Patients undergoing major Gastrointestinal Surgeries such as Abdomino Perineal Resection, Gastrectomy, Esophagectomy, Exploratory Laparotomy, Lower Anterior Resection, colectomy under General Anaesthesia.
2. Both Male and Female patients
3. Patients of 18 to 70 years of age.

Exclusion criteria

1. Refusal to give consent for Thoracic epidural and systemic opioid analgesics by patient
2. ASA-IV, ASA-V, ASA-VI Patients
3. Known Allergy to Bupivacaine and Opioids.
4. Patients with localized inflammation at the side of insertion of thoracic epidural needle.

Data collection: After the approval from the hospital research and ethics committee, Sixty cases of Gastrointestinal surgery undergoing general anaesthesia

meeting inclusion criteria were registered randomly. Consent to take part in this study was taken from Patients in both Groups. All patients were assessed preoperatively for any risk factors for administration of General Anaesthesia. Detailed history and examination were performed to rule out exclusion criteria. Their demographic information (Hospital chart number, Age, Sex, address) were obtained. The information regarding Diagnosis and Surgery of Patient was obtained.

Patients were randomized in two groups by lottery method, Group A and Group B respectively. Both Groups received Standard General Anaesthesia. Group A (Thoracic Epidural Analgesia group) consisted of patients receiving Thoracic Epidural Analgesia. Under Aseptic measures, Procedure to insert Thoracic Epidural catheter will be performed before surgery. This Procedure was performed in Sitting or Lateral position. These patients were given Thoracic Epidural Analgesic (0.125% Bupivacaine) for pain control in incremental doses of 5ml at intervals of 30 to 45 minutes, intraoperatively. Group B (Systemic Opioid Analgesia group) consisted of patients receiving standard Opioid Analgesics such as Fentanyl, Morphine and Tramadol.

After Preoxygenation, Patients were given fentanyl 1 mcg/kg intravenously. General Anaesthesia was induced with Propofol 2-4 mg/kg intravenously. Muscle relaxation was achieved by using either Suxamethonium 1.5mg/kg or Atracurium 0.5mg/kg intravenously. Anaesthesia was maintained by Oxygen, Air or Nitrous Oxide with Sevoflurane or Isoflurane. The end tidal CO_2 concentration was maintained between 35-45mmHg. During surgery, Paracetamol 20 mg/kg (intravenously) was also given, provided there was no contraindication to these medicine. At the end of surgery, neuromuscular blockade was antagonized with Neostigmine 50µg/kg plus Glycopyrolate 10µg/kg intravenously.

After extubation, Patients in both groups were observed from Postoperative Anaesthesia Care Unit (PACU) to Ward for times to first passage of flatus (Appendix - B). Group A was given Thoracic Epidural Analgesia with Bupivacaine 0.125% at 1-15 ml/hour postoperatively. Group B was given Systemic Opioid Analgesia with Fentanyl, Morphine and Tramadol postoperatively. Patients in both groups were followed up by me regarding times to first passage of flatus from Post Anaesthesia Care Unit to Ward/HDU/ICU. I collected data of patients in both groups myself for times to recovery of gastrointestinal function as per operational definition.

SPSS version 16.0 was used for data analysis. Qualitative variables e.g., gender were presented as frequency / percentages. Quantitative variables like age and time of gastrointestinal function recovery were presented by calculating mean and standard deviation. The time of gastrointestinal function recovery was compared between the two groups. Data was stratified for age, gender, ASA Class, type of surgery. Post stratification t test was applied. P value < 0.05 was considered as significant.

RESULT

In group A, mean age was 56.3±1.23 and in group B was 49.1±1.27 years. In group A, 17 patients (56.7%) and in group B, 21 patients (70.0%) were male while 13 patients (43.3%) in group A and 9 patients (30.0%) in group B were female. In group A, 7 patients (23.3%) were of ASA I class and in group B, 6 patients (20%) were of ASA II Class while in group A, 23 Patients (76.7%) were of ASA I Class and in group B, 24 patients (80.0%) patients were of ASA II Class (Table 1).

Mean time (hours) to Recovery of gastrointestinal function was 42.63±1.86 while in group B, Mean time to recovery of gastrointestinal function was 79.93±4.73 (P value =0.0002) Regarding type of surgery, in group A, 14 patients (46.7%) had colectomy who had mean recovery time of 46.43±22.75 hours and in group B, 18 patients (60.0%) had colectomy who had recovery time of 86.06±28.01. In group A, 10 patients (33.3%) had Abdominoperineal Resection who had mean time of 38.90±13.71hours and in group B, 7 patients (23.3%) had Abdominoperineal Resection who had mean time of 50.14±22.39. In group A, 5 Patients (16.7%) had Laparotomy who had mean time of 39.00±17.72hours and in group B, 2 Patients (6.7%) had Laparotomy who had mean time of 197±87.68hours. In group A, 1 Patient (3.3%) had lower anterior resection who had mean time of 45.00±0.00hours while in group B, 3 patients (10%) had lower anterior resection who had mean time of 34.67±17.10hours (Table 2).

Table-1: Distribution of characteristics of patients

Age (years)	Group A	Group B
Male	17(56.7%)	21(70%)
Female	13(43.3%)	9(30%)
ASA Class I	7(23.3%)	6(20%)
ASA Class II	23(76.7%)	24(80%)

Table 2: Comparison of mean time of gastrointestinal recovery in both groups

Group B	Group B	P value
Mean time of recovery (n=60)		
30 (100%)	30 (100%)	0.0002
42.63±18.65	79.93±47.37	
Colectomy		
14 (46.7%)	18 (60%)	0.0002
46.43±22.75	86.06±28.01	
Abdominoperineal Resection		
10 (33.3%)	7 (23.3%)	0.2171
38.90±13.71	50.14±22.39	
Laparotomy		
5 (16.7%)	2 (6.7%)	0.007
39.00±17.72	197±87.68	
Lower Anterior Resection		
1 (3.3%)	3 (10.0%)	0.6530
45.00±0.00	34.67±17.10	

DISCUSSION

Gastrointestinal Surgery is one of the most common surgical procedures performed in the world[2]. The outcome of gastrointestinal surgeries varies extensively, depending on factors like age and other systematic morbidities, the difficulty of surgery and management of post-operative retrieval, affect the outcome.[7] Current peri-operative treatment is upgraded in several ways during last decade. Physicians are also involved frequently to improve physical condition or medication of the patient[8]. TEA can help in

early gastrointestinal function recovery following gastrointestinal surgery without compromising the health of patient.[9] Rare complications of TEA may be brain injuries due to hemorrhage or infection in brain. The epidural abscesses are also negligible[10].

Opioid consumption has several side effects like nausea & vomiting, constipation, lethargy, irritating and sweating[11]. TEAs are suggested as they have superiority in relieving pain and less respiratory morbidities than opioids infusions.[12] TEAs may increase or decrease the capability of immune system to adequately respond to infections in postoperative time, and also raise or decline mesenteric perfusion[13].

The combination of general anaesthesia & TEAs has been approved as a choice of treatment in many hospitals in which major abdominal surgeries are performed. TEA progresses mesenteric blood circulation, upsurges oxygen supply to abdominal region and permits adequate postoperative pain control[14]. Literature proposed that for few cancer types, TEA can also decreases post-resection recurrence rate. The likelihood of decreasing recurrence of tumor causes the combination of general anaesthesia & TEAs even more attractiv[e1]. TEA advances the post-surgical gastrointestinal function recovery without much risk of gastrointestinal complications[9].

Opioids is associated with frequent side effects and in many cases dose needs to be reduced and cause devastating intestinal dysfunction. Post-operative ileus is usually aggravated with opioids intra- & post-operatively.[16] In the current study, one group was given Thoracic epidural opioid and second group received systemic opioid. The time to passage of flatus for patients in both groups undergoing gastrointestinal Surgeries following General anaesthesia was noted postoperatively. The time of gastrointestinal function recovery comprised the duration between from end of surgery to time of flatus passage.

In present study, Thoracic epidural analgesia group has shown early recovery of gastrointestinal function (mean time±SD = 42.63±1.86) as compared to Systemic Opioid analgesia group (Mean time±SD = 79.93±4.73). p value of 0.0002 was obtained which was considered extremely significant. My findings are comparable with the study of Shi WZ et al[10].

Twelve trials conducted on total 331 patients allocated in TEA group and 319 in Systemic Analgesia group were collected. TEA had better gastrointestinal recovery than Systemic Analgesia after gastrointestinal surgeries in terms of short surgery to first flatus passage duration i.e. 31.3 h, 95% CI: -33.2 to -29.4, $P < 0.01$; and short surgery to first stool passage duration i.e. 24.1 h, 95% CI: -27.2 to -20.9, $P < 0.001$[10]. Thus TEAs showed better and improved outcome as compared to Systemic Analgesia without any risk of gastrointestinal morbidities.[10] In another trial, 75 patients had laparoscopic colorectal resection. TEA group had 39 cases and Systemic opioid Analgesia group had 36. Duration of Gastrointestinal function recovery was significantly shorter with TEA (2.96±0.2days vs. 3.81±0.3days, $p = 0.025$). Duration of first passed flatus was reduced by 1day with TEA than Systemic opioid Analgesia.[17]

CONCULSION

Thoracic Epidural Analgesia is more effective in causing early recovery of gastrointestinal function than Systemic Opioid Analgesia, when used for adequate pain control in patients undergoing Gastrointestinal Surgeries.

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