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Original Research Article

Anaesthetic management of acute abdomen: a clinical study

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ABSTRACT

Background: Patients of acute abdomen present anaesthetic problems like fluid and electrolyte loss, intraoperative vomiting, regurgitation and aspiration, postoperative sickness, electrolyte imbalance, prolonged total parenteral alimentation etc. This study focused on intraoperative and postoperative complications with reference to anaesthetic management.
Methods: Around 300 patients, suffering from acute abdomen, operated during routine or emergency were randomly distributed in three groups, Group I General anaesthesia with narcotic analgesics and relaxants; Group II General anaesthesia with inhalational agents; Group III Spinal subarachnoid analgesia. No modification of pre and post-operative hospital care and treatment was done.
Results: There was a preponderance of younger age group patients (15 to 34years), more often in male patients. The mean duration in Group I was highest. Intraoperative Hypotension was the commonest (86 patients) followed by regurgitation and aspiration. Post-operative pyrexia was the commonest complication (120 patients) followed by postoperative nausea. ASA Grade III had a mortality of 22 patients (11.6%), ASA Grade IV having mortality of 46 patients (60.52%). About 221 patients had long duration of operations and the mortality was 28.95% as compared to 79 patients operated for short duration having mortality of 13.92%.
Conclusions: Outcome and the survival of the patients depend on the surgical disease, duration of surgery, preoperative ASA grading, degree of dehydration, and the anaesthetic technique.

Keywords: Acute Abdomen, General anaesthesia

INTRODUCTION

The term acute abdomen denotes an episode of severe abdominal disorder, which requires urgent intervention usually best treated by surgery, and encompasses a spectrum of surgical, medical, and gynecological conditions ranging from trivial to life threatening conditions.[1-3] The term acute abdomen usually includes acute intestinal obstruction-volvulus, intussusception, stricture etc., perforation peritonitis, perforated peptic ulcer, acute cholecystitis, acute appendicitis, strangulated or obstructed hernia, blunt or perforated abdominal injuries.[4-6]

The resultant leak caused by perforation of gastro-intestinal tract produces two types of reactions in the peritoneum.

- Chemical inflammation during first 6-8hrs.
- Septic process later, due to secondary bacterial invasion producing endotoxins.

Every patient with an acute abdomen is severely dehydrated unless proven otherwise.[7] Some of these patients are comparatively fit but others are so gravely ill that they present anaesthetic problems like fluid and electrolyte loss, intraoperative vomiting, regurgitation and aspiration, postoperative sickness, electrolyte imbalance, prolonged total parenteral alimentation etc.[8]

The aims and objectives were to study the pre-operative condition and problems in patients operated for acute abdomen, morbidity and mortality in these cases, the efficacy of different anaesthetic techniques used and to study the intraoperative and postoperative complications with reference to anaesthetic management.

METHODS

Three hundred patients, suffering from acute abdomen, operated during routine or emergency hours provided the material for this study. A detailed proforma was devised for complete physical examination and to record the preoperative, intraoperative and postoperative findings. Every patient was followed till 7 days postoperatively. The patients were included in one of three groups depending upon the anaesthetic technique used and so the total number of patients in the three groups could not be the same.

- Group I - General anaesthesia with narcotic analgesics and relaxants.
- Group II - General anaesthesia with inhalational agents.
- Group III - Spinal subarachnoid analgesia.

In Group I general anaesthesia was induced with sleep doses of thiopentone sodium followed by apnoeic dose of suxamethonium. Intubation done with appropriate cuffed endotracheal tube taking into consideration the risk of aspiration (with IPPV/crash induction/with Sellick's Manoeuvre/Awake). Anaesthesia was maintained on nitrous oxide, oxygen, adequate analgesia with pentazocine and muscle relaxation with non-depolarizing relaxants with controlled ventilation on closed circuit. At the end of surgery patients were reversed with adequate dose of neostigmine and glycopyrrolate.

In Group II induction was same but general anaesthesia was maintained on nitrous oxide, oxygen and inhalational anaesthetics such as isoflorane or sevoflorane, using semi closed circuit and spontaneous ventilation. At the end of surgery inhalational agents were shut off and patient was observed till all reflexes returned adequately.

In Group III, spinal analgesia was given under full asepsis using either 2cc. of 0.5% hyperbaric xylocaine or 2cc. of 0.5% hyperbaric bupivacaine. Patient was immediately brought to supine position after drug injection, head down tilt given depending upon the height of anaesthesia desired and a good intravenous line established. Vitals were monitored and maintained throughout. A detailed proforma was prepared and each case was entered systematically.

Premedication with injection atropine intramuscularly 30-45minutes prior to surgery was used in all the patients. No modification of pre and post-operative hospital care and treatment was done as the aim was to make a clinical study of the behaviour of the patient of acute abdomen with different type of anaesthetic management.

RESULTS

Table 1 shows the group wise age incidence. It is observed that there was a preponderance of younger age group patients (15 to 34years) group wise as well as in total i.e. 51.66%. Next were the middle age group (35 to 55years) i.e. 26.66%.

Table 1: Age distribution.

Age group	Years	Group I	Group II	Group III	Total	Percentage
Children	0-14	4	38	0	42	14.00
Young	15-34	84	12	59	155	51.66
Middle aged	35-55	42	0	38	80	26.66
Old	Above 56	20	0	3	23	7.66
Total		150	50	100	300	100.00

Higher incidence of acute abdomen in young and middle-aged patients is explainable based on a much larger active population of this age group. This was followed by children (0 to 14years). The old age group (above 56 years) were minimum in number. Table 2 shows a preponderance of male patients (78%) as compared to female patients (22%). This fact may be explained by the fact that obstetrical and gynaecological emergencies were excluded from this study. It may be probable that acute abdomen due to general surgical emergencies occurs more often in male patients.

Table 2: Sex incidences.

Sex	Group I	Group II	Group III	Total	Percentage
Male	116	38	80	234	78
Female	34	12	20	66	22
Total	150	50	100	300	100

Table 3 shows the mean duration in Group I was highest (135.13min.) as compared to Group II (113min.) and Group III (106.40min). The significant difference was seen because seriously ill patients and with complicated pathology were often managed by the anaesthetic technique of Group I.

Table 3: Duration of anaesthesia

Group I	Duration	No. of cases	Mean duration (min.)	Range (min.)
Group I (150 cases)	Long duration	125	135.13	45-360
	Short duration	25		
Group II (50 cases)	Long duration	36	113	60-180
	Short duration	14		
Group III (100 cases)	Long duration	60	106.40	60-180
	Short duration	40		

Table 4 shows the hypotension was the commonest (86 patients) followed by regurgitation and aspiration (51 patients). Out of the 51 patients 23 aspirated the contents into trachea. 16 patients in Group I and 7 patients in Group II had this complication. The aspiration occurred either at pre-intubation IPPV or in the post extubation period and it may indicate inadequate gastroduodenal suction. The complication of bradycardia was observed (10 patients) with spinal anaesthesia only.

Table 5 Shows the Post-operative pyrexia was the commonest complication (120 patients) followed by postoperative nausea (93 patients) and postoperative pulmonary complications (44 patients).

Table 4: Intraoperative complications.

Complication	Group I		Group II		Group III		Total
	Total	%	Total	%	Total	%	
Bradycardia	0	0	0	0	10	10	10
Hypotension	50	33.33	14	29	22	22	86
Regurgitation of gastric contents	40	26.66	11	22	0	0	51
Regurgitation of aspiration	16	10.70	7	14	0	0	0
Blood reaction	5	3.33	1	2	2	2	8
Hypovalaemic shock	5	3.33	0	0	0	0	5
Bronchospasm	1	0.66	0	0	0	0	1
Pulmonary oedema	2	1.33	0	0	0	0	2
Vomiting	0	0.00	0	0	2	2	2

Table 5: postoperative complications.

Complication	Group I		Group II		Group III		Total
	Total	%	Total	%	Total	%	
Post-operative pyrexia	66	44	17	34	37	37	120
Post-operative Nausea	48	32	20	40	25	25	93
Post-operative pulmonary complication	33	22	10	20	1	1	44
Post-operative deaths	50	33.33	19	38	6	6	75

Out of the 300 patients, 75 died (25%) in the postoperative period. Most patients (197) belonged to ASA Grade III, this group had a mortality of 22 patients (11.6%). 76 patients belonged to ASA Grade IV having mortality of 46 patients (60.52%). 7 patients belonged to ASA Grade V and all the patients died. Thus, the incidence of mortality has a very significant direct relationship with preoperative ASA grading i.e., the preoperative general condition.

There was no mortality in patients of ASA Grading II with any technique. In the patients of ASA Grading III, Group III (spinal) had the minimum mortality of 2.75% compared to 14.58% in Group I and 21.43% in Group II. Similarly, in patients of ASA Grade IV minimum mortality (33.33%) was observed in Group III compared to 65% in Group II and 65.90 % in Group II. Patients of ASA Grade V were all managed by Group I anaesthetic technique and all died.

Mortality in relation to age of the patient: Highest incidence of mortality occurred in children (45.23%) as compared to 30% in middle age group and 21.73 % in old age group. There was no significant difference in mortality in relation to sex of patients.

As many as 221 patients had long duration of operations and the mortality was 28.95% as compared to 79 patients operated for short duration having mortality of 13.92% as shown in Table 6.

Table 6: Mortality in relation to duration.

Duration	Number of cases	Number of cases died	%
Long duration (>90 minutes)	221	64	28.95
Short duration (<90 minutes)	79	11	13.92
Total	300	75	25.00

Mortality in relation to preoperative dehydration: Highest incidence of mortality was observed in patients having severe degree of dehydration. Out of 44 such patients 34 died (77.27%). Out of 146 patients with moderate dehydration 27 died (18.49%) and out of 110 patients with mild dehydration 14 died (12.72%).

Mortality in relation to cause of death: The cause of death was labelled as fluid and electrolyte imbalance and metabolic acidosis in 31 patients, sepsis and shock in 21 patients, regurgitation and aspiration in 18 patients.

Table 7 shows highest incidence of vomiting and regurgitation (46.25%) occurred in those cases where intermittent positive pressure ventilation was used before intubation. Patients in whom intubation was done with Sellick ‘s manoeuvre had regurgitation in 15.21% cases. Intubation with crash induction technique was associated with an incidence of 8.77% of regurgitation. In this study awake intubation was done in 17 patients and no incidence of regurgitation or vomiting was seen, making it the only sure technique to prevent aspiration.

Table 7: Effect of intubation technique.

Intubation technique	Total cases	Cases with vomiting and regurgitation	%
With IPPV	80	37	46.25
Crash intubation induction	57	05	8.77
Sellick’s manoeuvre	46	07	15.21
Awake intubation	17	00	0.00
Spinal analgesia	100	02	2.00
	300	51	17.00

Table 8 shows the maximum increase in Group II (46%) in whom inhalational anaesthesia was used followed by Group I (35.33%) where narcotic analgesic relaxant combination was used. Group III with spinal anaesthesia had very low incidence, (6%).

Table 8: Abdominal distension after surgery.

Groups	Total no. of cases	Abdominal distension increased after surgery	%
I	150	53	35.33
II	50	23	46.00
III	100	6	6.00
Total	300	82	27.33

DISCUSSION

Acute abdomen is one of the commonest surgical emergencies for operation. The problems faced in the anaesthetic management differ depending on preoperative condition of the patient and the cause of acute abdomen and on the technique of anaesthetic management.

Morton in 1957 discussed special dangers involved in anaesthesia for patients with intestinal obstruction.[8] However, not many reports are available in the anaesthetic literature on the complications and problems met with, while using different anaesthetic techniques. It was therefore considered worthwhile to undertake this study. Wylie in 1963 stated that no anaesthetic technique is foolproof, but the use of muscle relaxants following rapid induction of anaesthesia is hazardous in the presence of full stomach.[9] General anaesthesia is administered for emergency abdominal surgeries with ketamine as induction agent, muscle relaxant for intubation and inhalational agent for maintenance.[10]

Cricoid cartilage pressure (Sellick's maneuver) for allowing esophageal compression against the vertebral column has become universal practice during anesthetic induction in patients with potentially full stomach. When

adequately performed, this maneuver prevents gastric inflation in children and adults.[11-15]

Clark in 1963 found that high subarachnoid block does not prevent aspiration especially in heavily sedated patients.[16] In our study spinal anaesthesia was associated with low mortality compared to other two groups. The important points recorded in every patient were age, sex, ASA grading, degree of dehydration, degree of preoperative abdominal distension, duration of surgery, intraoperative and postoperative complications and clinical causes of death. No autopsy was done in any case suffering mortality, so the cause of death remained a clinical presumption. All the patients were analysed with respect to the above recorded findings.

When it comes to the incidence of different age groups in different groups, it depended on the anaesthetic technique used. For e.g. In group III spinal anaesthesia was used and therefore, there were no children in this group and the incidence of old patients was also low (3 patients). Since children were, mainly induced by inhalational methods, therefore Group II had highest incidence of children. In this hospital majority of adults are managed by the narcotic analgesics +relaxant technique, leading to highest patients in Group I.

Coller and Maddock had stated that the status of preoperative dehydration contributed to mortality.[17] More the dehydration, more will be the mortality. Frederick et el, concluded that small bowel obstruction very quickly give rise to dehydration and electrolyte loss.[18] Out of 44 such patients 34 died in this duration of study.

Fluid and electrolyte imbalance and metabolic acidosis can be the residual effects of preoperative dehydration or may develop in the postoperative period also. Similarly, endotoxic shock and sepsis have a relationship to the preoperative surgical condition giving rise to acute abdomen. Morton and Wylie in 1951 considered that 27% of deaths in acute abdomen were due to vomiting and regurgitation.[19] Berry in 1952 stated that the commonest cause of death in acute abdomen was the preoperative pathology and late complications like peritonitis and sepsis. [20]

CONCLUSION

Good understanding of how to handle emergencies helps reduce morbidity and mortality.

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REFERENCES

1. Chhetri RK, Shrestha ML. A comparative study of pre-operative with operative diagnosis in acute abdomen. Kathmanolu University Med. J. 2005;3(2):107-10.
2. Smith GCS, Paterson-Brown S. The acute abdomen and intestinal obstruction. In: Garden OJ, Bradbury AW, Forsythe J, eds. Principles and practice of surgery. London; Churchill Livingstone;2002:198-220.
3. Augustin G, Majerovic M. Non-obstetrical acute abdomen during pregnancy. Euro J Obs Gynecol Repro Biol. 2007;131(1):4-12.
4. Elhardello OA, MacFie J. Digital rectal examination in patients with acute abdominal pain. Emerg Med J. 2018;35(9):579-80.
5. Verki MM, Motamed H. Rectus muscle hematoma as a rare differential diagnosis of acute abdomen; a case report. Emerg. 2018;6(1):e28.
6. Kaushal-Deep SM, Anees A, Khan S, Khan MA, Lodhi M. Primary cecal pathologies presenting as acute abdomen and critical appraisal of their current management strategies in emergency settings with review of literature. Int J Crit Illness Injury Sci. 2018;8(2):90.
7. Bojarska A. Fluid management for emergency laparotomy in rural hospitals. Update in Anaes. 2005;20:7-11.
8. Morton H. Intestinal obstruction and anaesthesia. Brit Med J. 1957;2:224.
9. Wylie WD. The use of muscle relaxants at the induction of anaesthesia of patients with a full stomach. BJA: Brit J Anaes. 1963;35(3):168-73.
10. Jones, P, Turkstra, T. Gastrointestinal surgery. In: I. McConachie, Eds. Anesthesia for the High-Risk Patient. Cambridge: Cambridge University Press; 2009:278-292.
11. Sellick BA. Cricoid pressure to control regurgitation of stomach contents during induction of anaesthesia. The Lancet. 1961;278(7199):404-6.
12. Thwaites AJ, Rice CP, Smith I. Rapid sequence induction: a questionnaire survey of its routine conduct and continued management during a failed intubation. Anaes. 1999;54(4):376-81.
13. Salem MR, Wong AY, Mani M, Sellick BA. Efficacy of cricoid pressure in preventing gastric inflation during bag-mask ventilation in pediatric patients. Anesthesiol: J Am Society of Anesthesiol. 1974;40(1):96-8.
14. Lawes EG, Campbell I, Mercer D. Inflation pressure, gastric insufflation and rapid sequence induction. BJA: Brit J Anaes. 1987;59(3):315-8.
15. Asai T, Barclay K, McBeth C, Vaughan RS. Cricoid pressure applied after placement of the laryngeal mask prevents gastric insufflation but inhibits ventilation. Brit J Anaes. 1996;76(6):772-6.
16. Clark MM. Aspiration of stomach content in a conscious patient: a case report. BJA: Brit J Anaes. 1963;35(2):133-4.
17. Coller FA, Maddock WG. Dehydration attendant on surgical operations. JAMA.1932;99(11):875-80.
18. Stephens FO. Syndrome of Intestinal Pseudo-obstruction. Brit Med J. 1962;1(5287):1248-38.

19. Morton HJ, Wylie WD. Anaesthetic deaths due to regurgitation or vomiting. Anaesthesia. 1951;6(4):190-201.

20. Berry RE. Diagnosis and treatment of acute intestinal obstruction. J Am Med Associa. 1952;148(5):347-55.

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