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Original Research Article

To evaluate the effectiveness of intraperitoneal instillation of 0.5% ropivacaine for improving perioperative haemodynamics.

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Abstract:

Background & Aim

Pain following laparoscopy is due to irritation of diaphragm and stretching of peritoneum associated with carbon dioxide insufflation**.** The aim of the study is to evaluate the effectiveness of intraperitoneal instillation of 0.5% ropivacaine for improving perioperative haemodynamics in paediatric age group.

Method

After receiving ethical committee approval in NSCB Medical College Jabalpur and written and informed consent of parents,.60 ASA I and ASA II patients of both sex of age group 6-14 years were randomly allocated to two groups. In group R, 0.5% Ropivacaine was instilled intraperitoneally under the surface of diaphragm after the creation of pneumoperitoneum. In group C Normal Saline was instilled instead of ropivacaine. Both the groups were subjected to pre-incisional periportal infiltration with 1%lignocaine.Heart rate(HR) and Mean Arterial Pressure(MAP) were recorded at 5 minutes interval for a duration of 60 minutes..

Results

Heart Rate (HR)noted every five minutes for the duration of surgery were lower in Group R(study group) in comparison to Group C(control group). The results were comparable and the difference was found to be significant($p<0.0001$) in the two groups intraoperatively for the duration of surgery. Also heart rate after extubation was significantly lower ($p<0.0001$) in the study group(Mean 81.77±2.75) than the control group(Mean 99.27±1.36).Mean blood pressure was recorded every 5 minutes in both the groups for the duration of surgery. Blood pressure readings were significantly lower in Group R ($p<0.001$)[Mean 81.27] than in Group C[Mean 85.70].

Conclusion

Intraperitoneal instillation of ropivacaine is a safe and effective modality of providing analgesia that improves intraoperative haemodynamics.

Keywords: effectiveness, intraperitoneal, ropivacaine, perioperative & haemodynamics**.**

Study Designed: Randomized Prospective Controlled Study.

1. Introduction

Laparoscopy is a modern, minimally invasive surgical/diagnostic procedure, in which abdominal cavity is visualized with a scope[1]. This surgery can be performed with minimal surgical incision thereby leading to less pain, less paralytic ileus, short hospital stay and early

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ambulation. Pain relief is an important goal of anaesthesia. Any degree of pain is significant to a patient. It makes a difference in duration of hospital stay and time of ambulation[2].
The cause of pain in abdominal surgeries is 1. Somatic 2. Visceral. Somatic pain is due to skin incision and the visceral pain is due to handling of the intestine and peritoneal inflammation[3]. During open surgeries, both somatic and visceral pain will be present which may not be tolerable to a patient without adequate analgesia. In laparoscopic surgeries somatic pain is very less due to a small skin incision[4]. But visceral pain is more prominent due to visceral nociceptor stimulation .Visceral Pain may occur due to rapid distension of peritoneum, intraperitoneal inflammation, traction of nerves and vessels, diaphragmatic irritation (shoulder tip pain).
Ropivacaine, a newer analgesic, with a better toxicity profile is a safer alternative to bupivacaine.

2. Materials & Method

The study was carried out in Department of Anaesthesiology, NSCB Medical College and Hospital, Jabalpur, M.P.. After careful pre-anaesthetic check-up of the patients, written informed consent was obtained from legal guardians. 60 ASA I and ASA II patients of both sex of age group 6-14 years Patients were allocated randomly into two groups according to (study) drug received:
Group R: In this group of patients 0.5% Ropivacaine was instilled intraperitoneally under the surface of diaphragm after the creation of pneumoperitoneum.
Group C (Control group): Normal Saline was instilled instead of ropivacaine. Both the groups were subjected to pre-incisional periportal infiltration with 1%lignocaine.

Patients were sedated with intramuscular (IM) midazolam at a dose of 0.1mg/kg, 20 minutes before the procedure. On arrival of patient to the operating room, routine monitoring devices such as Electrocardiography(ECG), non-invasive blood pressure, pulse oximetry (SpO 2) and End tidal CO 2 (EtCO 2) probe were applied to the patient. An intravenous access (IV) with intravenous catheter was secured.

Patients were preoxygenated with 100% oxygen for 3 minutes with a close fitting mask. After administration of IV glycopyrrolate 0.01mg/kg and fentanyl at a dose of 2 microgram/kg body weight, induction was carried out by iv propofol 2mg/kg body weight and atracurium at a dose for 0.5mg/kg. Tube size was calculated according to the formula Age/4+4 followed by laryngoscopy and endotracheal tube insertion. General anaesthesia was maintained with 100% oxygen, sevoflurane and atracurium 0.1mg/kg every 20 to 30 minutes to ensure proper muscle relaxation, Pneumoperitoneum was created during laparoscopy. In Group R: 0.5% Ropivacaine was instilled under the diaphragm by the surgeon after the insufflations of CO 2

Group C: laparoscopic surgery was performed with instillation of normal saline under the diaphragm after insufflation.Patients in both groups received paracetamol at a dose of 15mg/kg by the end of surgery .At the end of operation, reversal of muscle relaxation was carried out using Neostigmine at a dose of 0.06mg/kg and glycopyrrolate at a dose of 0.01 mg/kg.Heart rate (HR) and Mean arterial (MAP) pressure were recorded at 5 minutes interval. The HR and MAP in the preoperative period until time of induction were denoted by HR0 and MAP0 respectively. Intraoperatively at an interval of 5 minutes heart rate and Mean arterial pressure were denoted by HR5,HR10….till HR60 and MAP5,MAP10…MAP60.

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INCLUSION CRITERIA:

- Sixty paediatric patients, ASA I and ASA II of both sex of age group 6-14 years posted for elective laparoscopic surgery were included in the study.

EXCLUSION CRITERIA:

- Parental refusal
- Patients allergic to Ropivacaine or any other local anaesthetic.
- Patient receiving anti-epileptic therapy.
- Patients with severe cardiopulmonary, hepatic or renal problems.
- Patients with congenital anomalies.
- Duration of surgery > 60 minutes.

3. Results

TABLE NO. – 1: SEX GROUP CROSS-TABULATION

			GROUP		Total
			ROPIVACAINE(R)	CONTROL (C)	
Sex	Female	N	13	10	23
		%	43.3%	33.3%	38.3%
	Male	N	17	20	37
		%	56.7%	66.7%	61.7%
Total		N	30	30	60
		%	100.0%	100.0%	100.0%
Mean			8.9	8.8	
SD			3.0	2.75	

TABLE NO. – 2: AGE GROUP CROSS-TABULATION

			GROUP		Total
			ROPIVACAINE(R)	CONTROL(C)	
Age Group	6 yrs.	N	12	9	21
		%	40.0%	30.0%	35.0%
	7-10 yrs	N	7	13	20
		%	23.3%	43.3%	33.3%
	11-14 yrs	N	11	8	19
		%	36.7%	26.7%	31.7%
Total		N	30	30	60
		%	100.0%	100.0%	100.0%

TABLE NO. – 3: COMPARISON OF INTRAOPERATIVE HEART RATE BETWEEN STUDY AND CONTROL GROUP

Variable	ROPIVACAINE				CONTROL				t test	p value
	Mean	SD	Min	Max	Mean	SD	Min	Max		
Age	8.90	3.00	6	14	8.80	2.75	6	14	0.135	0.893

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Weight	25.83	8.84	14	42	25.30	8.09	15	42	0.244	0.808
duration of surgery	48.00	8.05	25	60	45.83	5.27	30	55	1.234	0.222
hr pre-op	113.93	7.25	100	126	98.43	4.84	90	112	9.74	<0.0001
hr 5min	111.80	6.79	100	124	99.17	4.68	90	113	8.385	<0.0001
hr 10min	110.83	6.72	101	125	99.27	5.21	91	114	7.452	<0.0001
hr 15min	109.97	6.29	99	124	100.70	6.41	90	115	5.649	<0.0001
hr 20min	108.60	6.44	99	122	101.47	5.78	90	118	4.516	<0.0001
hr 25min	107.77	6.11	101	120	102.77	5.05	90	116	3.454	0.001
hr 30min	105.97	6.37	100	122	103.80	3.33	99	115	1.651	0.104
hr 35min	104.40	5.78	98	118	104.37	4.11	100	117	0.026	0.98
hr 40min	105.77	6.78	97	120	104.00	3.64	100	118	1.257	0.214
hr 45min	103.67	6.94	95	118	104.50	3.70	100	120	-0.58	0.564
hr 50min	102.87	7.09	93	115	105.30	3.90	99	117	-1.647	0.105
hr 55min	103.90	6.35	95	118	104.60	3.81	99	118	-0.517	0.607
hr 60min	102.87	6.57	92	120	104.80	5.22	88	120	-1.261	0.212

TABLE NO. – 4: COMPARISON OF INTRAOPERATIVE BLOOD PRESSURE (STUDY AND CONTROL GROUP)

Variable	ROPIVACAINE				CONTROL				t test	p value
	Mean	SD	Min	Max	Mean	SD	Min	Max		
bp pre-op	85.17	4.74	73	96	87.87	4.21	82	100	-2.333	0.023
bp 5min	84.10	4.45	74	94	87.17	4.03	83	100	-2.798	0.007
bp 10min	82.57	4.56	72	92	86.13	4.17	80	99	-3.159	0.003
bp 15min	81.27	4.49	70	90	85.70	4.43	80	97	-3.849	<0.0001
bp 20min	80.90	4.29	69	89	85.13	5.22	80	102	-3.429	0.001
bp 25min	81.03	3.54	70	88	86.43	5.33	80	103	-4.624	<0.0001
bp 30min	81.73	3.34	71	87	142.73	212.17	81	923	-1.575	0.121
bp 35min	81.67	2.60	72	88	88.73	5.22	80	110	-6.636	<0.0001
bp 40min	81.90	3.13	72	90	89.33	4.65	80	105	-7.263	<0.0001
bp 45min	81.90	3.52	70	92	90.67	4.13	86	108	-8.852	<0.0001
bp 50min	80.93	3.19	71	90	91.53	4.77	87	110	-10.116	<0.0001
bp 55min	82.00	3.59	70	91	92.63	4.06	88	103	-10.739	<0.0001
bp 60min	81.83	3.71	70	90	93.43	4.33	90	105	-11.139	<0.0001
spo2	99.57	0.68	98	100	99.70	0.47	99	100	-0.887	0.379

There was no significant difference between age, sex and duration of surgery between the two groups. There was also no significant difference between SPO2 between the two groups intraoperatively.

Mean heart rate noted every five minutes for the duration of surgery were lower in Group R(study group) in comparison to Group C(control group). The results were comparable and the difference was found to be significant($p<0.0001$) in the two groups intraoperatively for the duration of surgery. Also heart rate after extubation was significantly lower ($p<0.0001$) in the study group(Mean 81.77±2.75) than the control group(Mean 99.27±1.36).

Mean blood pressure was recorded every 5 minutes in both the groups for the duration of surgery. Blood pressure readings were significantly lower in Group R ($p<0.001$)[Mean 81.27]

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than in Group C[Mean 85.70].Mean blood pressure after extubation was significantly lower in Group R(Mean 82.23±2.92) than in Group C(89.07±4).

4. Discussion

Laparoscopic techniques have gained popularity in recent years mainly because of the fact that it involves small incision along with short hospital stay and early ambulation[5]. Though it has got various advantages of its own, the peritoneal stretching due to the insufflation of gas results in excessive pain postoperatively. Pain is the most predominant complaint following laparoscopic procedures in the early postoperative period. It arises mainly due to chemical irritation of the peritoneum, distension of the abdomen, soft tissue injury, or incisional trauma at the trocar entry sites. In an attempt to decrease the severity of pain following laparoscopic procedures, various techniques such as using low inflation pressure, local anaesthetic infiltration at port sites or intraperitoneal nebulization of local anaesthetic have been tried[6]. Other means to provide analgesia include subarachnoid block, parenteral opioids and NSAIDs. As pain after laparoscopic surgery is multifactorial, a multimodal approach to postoperative pain management is adopted. The use of intraperitoneal instillation of local anaesthetic is emerging as a promising modality for postoperative pain management in these patients[7]. Several factors are important for intraperitoneal instillation of drug to decrease postoperative pain, which include choice of drug, concentration of drug, volume of drug and timing of drug administrat Ropivacaine is a long-acting amide type local anaesthetic used as regional anaesthetic. It is a pure S(−) enantiomer, developed for the purpose of reducing potential cardiac toxicity and improving relative sensory and motor block profiles[8]. When ropivacaine is given intraperitoneally it starts acting within 10–20 min, and duration of action lasts for 4–6 h.

5. Conclusion

Pain during laparoscopy is less intense tan during laparotomy, but is not pain free. Intraperitoneal instillation of ropivacaine is a safe and effective modality of providing analgesia that improves intraoperative haemodynamics,

6. References

1. Papadima A, Lagoudiankis EE, Antonakis P, Fillis K, Makri I, Markogiannakis H, et al. Repeated intaperitoneal instillation of levobupivacaine for the management of pain after laparoscopic cholesystectomy. 2009;146:475-482.
2. Jairath A, Gupta S, Singh K, Katyal S. Can intraperitoneal tramadol decrease pain in patients undergoing laparoscopic cholecystectomy in postoperative period? A randomized controlled trial. World J Laparosc Surg 2017;10:26‑9.
3. Khurana S, Garg K, Grewal A, Kaul TK, Bose A. A comparative study on postoperative pain relief in laparoscopic cholecystectomy: Intraperitoneal bupivacaine versus combination of bupivacaine and buprenorphine. Anesth Essays Res 2016;10:23‑8.
4. Reynolds W Jr. The first laparoscopic cholecystectomy. JSLS 2001;5:89‑94.
5. Kaushal‑Deep SM, Lodhi M, Anees A, Khan S, Khan MA. Randomised prospective study of using intraoperative, intraincisional and intraperitoneal ropivacaine for the early discharge of postlaparoscopic cholecystectomy patients as a day case in a cost‑effective way in government setup of low income and middle‑income countries: Opening new horizons. Postgrad Med J 2019;95:78‑84.

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6. Hernández‐Palazón J, Tortosa JA, Nuño de la Rosa V, Giménez‐Viudes J, Ramírez G, Robles R. Intraperitoneal application of bupivacaine plus morphine for pain relief after laparoscopic cholecystectomy. Eur J Anaesthesiol 2003;20:891‐6.
7. Ram D, Sistla SC, Karthikeyan VS, Ali SM, Badhe AS, Mahalakshmy T. Comparison of intravenous and intraperitoneal lignocaine for pain relief following laparoscopic cholecystectomy: A double‐blind, randomized, clinical trial. Surg Endosc 2014;28:1291‐7.
8. Sharan R, Singh M, Kataria AP, Jyoti K, Jarewal V, Kadian R. Intraperitoneal instillation of bupivacaine and ropivacaine for postoperative analgesia in laparoscopic cholecystectomy. Anesth Essays Res 2018;12:377‐80.