



EFFICACY AND SAFETY OF USG GUIDED TAP BLOCK USING MAGNESIUM SULPHATE AS AN ADJUVANT WITH BUPIVACAINE AND BUPIVACAINE ALONE FOR POSTOPERATIVE PAIN RELIEF IN LAPAROSCOPIC CHOLECYSTECTOMY

Dr. Solanki Yogesh Naranbhai	Second year Resident, BJMC, Ahmedabad
Dr. Uchhadiya Amit Vinodbhai	Senior Resident, BJMC, Ahmedabad
Dr. Seema Gandhi	Assistant Professor, BJMC, Ahmedabad
Dr. Siddhpuria Kinjal Nitinkumar	Senior Resident, BJMC, Ahmedabad
Dr. Patel Nitinkumar Ramanbhai	First year Resident, BJMC, Ahmedabad

ABSTRACT Laparoscopic Cholecystectomy is one of the most common surgical procedure considered as the gold standard for the treatment of symptomatic gallbladder disease. Pain at the port sites is due to stretching by pneumoperitoneum and hepatic bed disturbances. Different techniques are in practice for postoperative analgesia. Now a days, Transversus Abdominis Plane (TAP) block is commonly performed truncal neural block owing to its high success rate, feasibility, safety and its ability to provide prolonged postoperative pain relief. In this block, local anaesthetic is infiltrated between the internal oblique and transversus abdominis muscle which blocks ventral rami of lower six thoracic and upper lumbar nerves (T7 to L1) especially subcostal (T12), ilioinguinal (L1) and iliohypogastric (L1). The study designed to evaluate the efficacy and safety of USG guided Right sided Subcostal TAP block using Magnesium Sulphate as an adjuvant with Bupivacaine and Bupivacaine alone for postoperative pain relief in patients undergoing Laparoscopic Cholecystectomy. Addition of Magnesium sulphate 500 mg as an adjuvant to Bupivacaine (0.25%) 20 ml provides better analgesia, longer duration of effective analgesia, better hemodynamic stability and requires less analgesic consumption in postoperative period.

KEYWORDS : TAP block, Bupivacaine, Magnesium sulphate, Postoperative analgesia

INTRODUCTION

Laparoscopic cholecystectomy is one of the most common surgical procedure considered as the gold standard for the treatment of symptomatic gallbladder diseases like Cholelithiasis and Cholecystitis. As the laparoscopic procedures are minimally invasive, it is observed that it produces lesser pain as compared to open procedures in postoperative period. It is necessary to alleviate the pain in postoperative period which is required for early ambulation there by reduces the postoperative complications and also for better clinical and surgical outcomes. Pain at the port sites is due to stretching by pneumoperitoneum and hepatic bed disturbances^[1].

Various analgesic drugs like Paracetamol, Nonsteroidal Anti-inflammatory drugs (NSAIDs) and Opioids etc by different routes are in practice to relieve postoperative pain. NSAIDs are associated with its own adverse effects and it should be used with caution due to its possible side effects in elderly patients, patients with renal, cardiac and liver disease and in patients with history of gastrointestinal bleeding^[2]. Use of opioids is limited by its side effects like nausea, vomiting, respiratory depression, urinary retention, etc.

Now a days, Transversus Abdominis Plane (TAP) block is commonly performed truncal neural block owing to its high success rate, feasibility, safety and its ability to provide prolonged postoperative pain relief. In this block, local anaesthetic is infiltrated between the internal oblique and transversus abdominis muscle which blocks ventral rami of lower six thoracic and upper lumbar nerves (T7 to L1) especially subcostal (T12), ilioinguinal (L1) and iliohypogastric (L1). It can be given blindly but Ultrasound guided technique provides direct visualization of transversus abdominis plane, requires minimal time and decreases number of attempts thereby it is more accurate and safer with minimal complications.^[3,4,5,6]

Of various local anaesthetics used for Transverse Abdominal Plane (TAP) block, Bupivacaine is the most commonly administered long acting drug in anaesthesia practice. It has onset of 20-30 minutes and its effect lasts for 8-9 hours^[7,8]. Various adjuvants are in practice to increase the duration of LA for post operative pain relief like opioids, Alpha agonist (Clonidine, Dexmedetomidine), Dexamethasone,

Magnesium Sulphate etc. The unique feature of Magnesium Sulphate is that it is N-methyl D-aspartate (NMDA) antagonist which blocks ion channels in a voltage dependent fashion. These receptors are found in many parts of the body, including the nerve endings, and plays a well-defined role in modulating pain and a number of inflammatory responses. Magnesium Sulphate could prevent central sensitization that occurs due to the peripheral nociceptive stimulation^[9,10,11].

The present study will be conducted to evaluate the efficacy and safety of Ultrasonography guided Right sided Subcostal Transversus Abdominis Plane block using Magnesium Sulphate as an adjuvant with Bupivacaine and Bupivacaine alone for postoperative pain relief in patients undergoing Laparoscopic Cholecystectomy.

METHODS

Method Of Collection Of Data:

This study was carried out after obtaining permission from institutional ethical committee and obtaining written informed consent of the patient's relative. We recruited 60 patients aged 18-65 years with ASA Risk I, II, III scheduled for Laparoscopic cholecystectomy for the prospective research study.

Mode Of Selection Of Cases:

Randomised computer sampling technique into 2 groups with each group including 30 patients:

- **Group A** patients received TAP block with (0.25%) Bupivacaine Total volume 20ml.
- **Group B** patients received TAP block with (0.25%) Bupivacaine plus 500mg Magnesium sulphate total volume 20ml.

Inclusion Criteria:

Age of patient 18-65 years, ASA Grade I, II, III, Either Sex, Weight 40-80 kg, Scheduled for elective laparoscopic cholecystectomy. Written informed consent by patient and patient's relative

Exclusion Criteria:

Patient refusal, ASA Grade IV and V, Allergy to amide group of local anaesthetic agent, Contraindication to Transversus Abdominis Plane

(TAP) block, Renal disease, Cardiac disease, Respiratory disease and psychiatric history, Inability to comply with study assessment, Pregnancy and lactation, Patient on anticoagulants or having bleeding disorder, Underlying other significant systemic disease, Patient with severe hemodynamic instability.

Procedure:

Following a comprehensive pre-anaesthetic evaluation, all the patients were explained about VAS. They were electively fasted 8 hours preoperatively.

After arrival in operating room, routine monitoring (ECG, pulse oximetry, non-invasive arterial blood pressure) were applied and intravenous line was secured into a suitable vein. Administration of 500ml DNS (0.9% sodium chloride & 5% dextrose) or selective fluid of choice via peripheral access was started. Baseline vitals were recorded. The patient was given premedication in the form of Inj. Glycopyrrolate (0.004 mg/kg), Inj. Ondansetron (0.15mg/kg) and Inj. Fentanyl (0.002mg/kg) intravenously. All patients were then pre-oxygenated with 100% oxygen via Bain circuit with fresh gas flow of 8 L/min for 3-5 mins. General Anaesthesia was induced with Inj. Propofol 1% (2.5mg/kg) premixed with preservative free Inj. Lignocaine (2%) (1.5 mg/kg) intravenously. Laryngoscopy and intubation were facilitated by giving Depolarizing muscle relaxant Inj. Succinylcholine (2mg/kg) intravenously. For maintenance oxygen (100%), sevoflurane (0.2-2%) and Non-Depolarizing muscle relaxant Inj. Atracurium (0.5mg/kg) loading dose intravenously was given and thereafter (0.1mg/kg) intravenously was given intermittently. Intraoperative monitoring (Pulse Rate, Non-invasive blood pressure, SpO₂, EtCO₂, Input-Output) was done.

After the completion of surgery, Right sided Subcostal Transversus Abdominis Plane (TAP) block was performed under ultra-sonographic guidance in both group patients in supine position with in-plane approach.

Group A patients, TAP block was given with (50 mg 0.5% Bupivacaine+10 ml Saline Solution) = 0.25% Bupivacaine (Total 20ml) on selected site Group B patients, TAP block was given with (0.25% Bupivacaine plus 500mg Magnesium sulphate) total volume 20ml on selected site After completion of procedure, all patients were reversed from neuromuscular block with Acetylcholinesterase enzyme inhibitor Inj. Neostigmine (0.05mg/kg) intravenously premedicated with Anticholinergic Inj. Glycopyrrolate (0.008mg/kg) intravenously. After oral and tracheal suction, extubation was done after assessing the patient. At end of the operation, the first assessment of pain was undertaken at 30 mins. The presence and severity of pain, nausea, vomiting and any other side effects were assessed for all patients in both groups. Pain scores and vitals were evaluated every 30mins for 2hours and then every 2 hours for 24 hours and time for rescue analgesia in both groups were noted by the observer who is unaware of study protocol. If Visual Analogue Score (VAS) score is >4 rescue analgesic [Inj. Diclofenac sodium (1.5 mg/kg)] intravenously was given. The time of first onset & the time of first request for analgesia requirements during the first 24 hours were noted.

Parameters To Be Observed

Intraoperative and Postoperative Vitals, ECG, Pulse rate, Systolic Blood Pressure, Diastolic blood pressure, Mean arterial blood pressure, SpO₂, EtCO₂, Postoperative Assessment of pain by Visual Analogue score

Pain score (Visual Analogue Pain Scale):

0 = No Pain 1-3 = Mild Pain
4-6 = moderate Pain. 7-9 = severe Pain
10 = severe excruciating Pain

OBSERVATION AND RESULTS

After studying 60 cases, the observation and results were summarized. All the patients were divided into two groups with 30 patients in each group.

Group A: Patients received TAP block with Bupivacaine (0.25%) Total volume 20ml. **Group B:** Patients received TAP block with Bupivacaine (0.25%) plus 500mg (1ml) of Magnesium sulphate Total volume 20ml.

No significant difference found between the groups in terms of age, weight or ASA status

Table 1 : ASA Grading

Groups	Grade 2	Grade 3	Total
Group A	13(43.3%)	17(56.7%)	30(100%)
Group B	13(43.3%)	17(56.7%)	30(100%)
Total	26(43.3%)	34(56.7%)	60(100%)

Table 1 shows ASA risk is comparable in both the groups.

Intra Operative Hemodynamics Parameters

Table 2 : Heart Rate (per min)

		0 Min	30 Min	1 Hour	1.5 Hours	2 Hours
Group A	Mean	89.73	96.23	96.20	90.93	92.67
	S.D.	13.57	11.98	13.83	11.87	9.80
Group B	Mean	86.47	96.20	93.80	85.07	82.33
	S.D.	15.11	12.90	10.61	9.86	10.17

Table 2 shows the mean Heart Rate in intraoperative period.

Table 3 : Mean Arterial Pressure (mm of Hg)

		0 Min	30 Min	1 Hour	1.5 Hours	2 Hours
Group A	Mean	91.93	98.64	95.53	88.04	86.98
	S.D.	8.19	8.13	9.11	8.26	5.65
Group B	Mean	95.82	103.38	98.09	91.49	86.51
	S.D.	9.55	8.71	7.89	6.83	6.23

Table 3 shows the Mean Arterial Pressure in intraoperative period.

Table 4 : EtCO₂

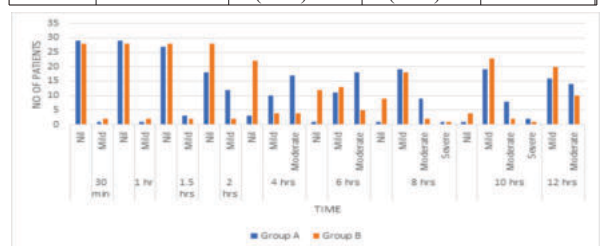
		0 Min	30 Min	1 Hour	1.5 Hours	2 Hours
Group A	Mean	22.57	29.53	35.87	34.37	33.70
	S.D.	3.26	2.08	3.88	1.59	2.22
Group B	Mean	22.37	28.10	38.20	35.10	31.63
	S.D.	2.68	2.17	2.23	3.08	1.63

Table 4 shows the mean EtCO₂ during intraoperative period.

Vas Grading In Posoperative Period

Table 5 : VAS Grading on Rest

Time	VAS Grading	Group A	Group B	P Value
30 min	Nil	29(97%)	28(93%)	1
	Mild	1(3%)	2(7%)	
1 hr	Nil	29(97%)	28(93%)	1
	Mild	1(3%)	2(7%)	
1.5 hrs	Nil	27(91%)	28(93%)	1
	Mild	3(9%)	2(7%)	
2 hrs	Nil	18(60%)	28(93%)	0.006
	Mild	12(40%)	2(7%)	
4 hrs	Nil	3(10%)	22(74%)	0.00002
	Mild	10(33%)	4(13%)	
	Moderate	17(57%)	4(13%)	
6 hrs	Nil	1(3%)	12(40%)	0.00009
	Mild	11(37%)	13(43%)	
	Moderate	18(60%)	5(17%)	
8 hrs	Nil	1(3%)	9(30%)	0.03
	Mild	19(64%)	18(60%)	
	Moderate	9(30%)	2(7%)	
	Severe	1(3%)	1(3%)	
10 hrs	Nil	1(3%)	4(13%)	0.31
	Mild	19(64%)	23(77%)	
	Moderate	8(26%)	2(7%)	
	Severe	2(7%)	1(3%)	
12 hrs	Mild	16(53%)	20(67%)	0.15
	Moderate	14(47%)	10(33%)	

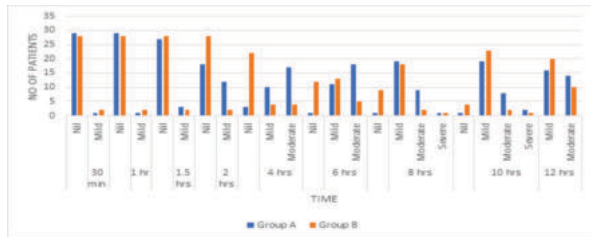


Graph 1: VAS Grading on Rest

Table 5 and graph 1 shows VAS grading on rest at different time interval in postoperative period. In Group A most of the patients experienced mild to moderate pain and three patients had severe pain while in Group B most of the patients either had no or mild pain and very few had moderate pain but only two patients had severe pain at 2, 4, 6 and 8 hours which was statistically significant ($p < 0.05$).

Table 6 : VAS Grading on Coughing

Time	VAS Grading	Group A	Group B	P Value
30 min	Nil	27(91%)	29(97%)	0.6
	Mild	3(9%)	1(3%)	
1 hr	Nil	26(87%)	27(91%)	1
	Mild	4(13%)	3(9%)	
1.5 hrs	Nil	25(83%)	29(97%)	0.19
	Mild	5(17%)	1(3%)	
2 hrs	Nil	15(50%)	26(87%)	0.005
	Mild	15(50%)	4(13%)	
4 hrs	Nil	2(7%)	12(40%)	0.0002
	Mild	6(16%)	13(43%)	
	Moderate	22(74%)	5(17%)	
6 hrs	Nil	1(3%)	10(33%)	0.00015
	Mild	7(23%)	15(50%)	
	Moderate	22(74%)	5(17%)	
8 hrs	Nil	1(3%)	9(30%)	0.0002
	Mild	11(37%)	19(64%)	
	Moderate	17(57%)	1(3%)	
10 hrs	Nil	1(3%)	2(7%)	0.185
	Mild	12(40%)	20(67%)	
	Moderate	16(54%)	7(23%)	
	Severe	1(3%)	1(3%)	
12 hrs	Mild	15(50%)	16(53%)	1
	Moderate	15(50%)	14(47%)	



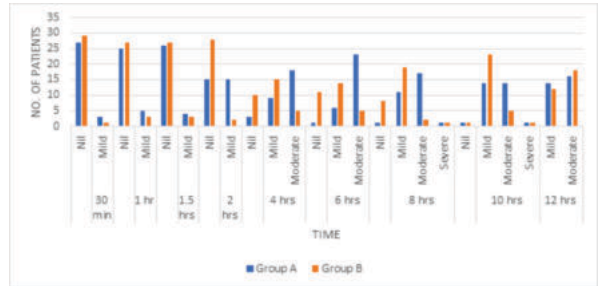
Graph 2: VAS Grading on Coughing

Table 6 and Graph 2 shows VAS grading on coughing at different time interval in postoperative period. In Group A, most of the patients experienced mild to moderate pain and two patients had severe pain while in Group B most of the patients either had no or mild pain and very few experienced moderate pain but only two patients had severe pain at 2, 4, 6 and 8 hours which was statistically significant difference ($p < 0.05$).

Table 7 : VAS Grading on Deep Inspiration

Time	VAS Grading	Group A	Group B	P Value
30 min	Nil	27(90%)	29(97%)	0.6
	Mild	3(10%)	1(3%)	
1 hr	Nil	25(83%)	27(90%)	0.7
	Mild	5(17%)	3(10%)	
1.5 hrs	Nil	26(87%)	27(90%)	1
	Mild	4(13%)	3(10%)	
2 hrs	Nil	15(50%)	28(93%)	0.0006
	Mild	15(50%)	2(7%)	
4 hrs	Nil	3(10%)	27(90%)	0.0064
	Mild	9(30%)	2(7%)	
	Moderate	18(60%)	1(3%)	
6 hrs	Nil	1(3%)	11(36%)	0.00005
	Mild	6(20%)	14(47%)	
	Moderate	23(77%)	5(17%)	
8 hrs	Nil	1(3%)	8(26%)	0.0009
	Mild	11(37%)	19(64%)	
	Moderate	17(57%)	2(7%)	
10 hrs	Nil	1(3%)	1(3%)	0.109
	Mild	12(40%)	20(67%)	
	Moderate	16(54%)	7(23%)	
	Severe	1(3%)	1(3%)	

	Mild	14(47%)	23(77%)	
	Moderate	14(47%)	5(17%)	
	Severe	1(3%)	1(3%)	
12 hrs	Mild	14(47%)	12(40%)	0.79
	Moderate	16(53%)	18(60%)	

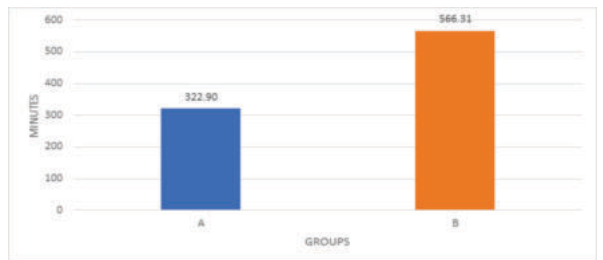


Graph 3: VAS Grading on Deep Inspiration

Table 7 and Graph 3 shows VAS Grading on deep inspiration noted at different time interval in postoperative period. In Group A, most of the patients experienced mild to moderate pain and two patients had severe pain while in Group B most of the patients experienced no or mild pain and very few experienced moderate pain but only two patients had severe pain at 2, 4, 6 and 8 hours which was statistically significant ($p < 0.05$).

Table 8 : Duration of Effective Analgesia (mins)

Group A (Mean ± SD) mins	Group B (Mean ± SD) mins	P value
322.90 mins ± 97.20	566.31 mins ± 105.48	<0.0001 S



Graph 4: Duration of Effective Analgesia (mins)

Table 8 and Graph 4 shows the Duration of Effective Analgesia which was calculated from the time between the end of local anaesthetic administration to the time when VAS was in category of moderate and 1st rescue analgesic was administered.

Post Operative Hemodynamics Parameters

Table 9 : Pulse Rate (per min) in Postoperative period

	30 Mins	1 Hour	1.5Ho urs	2Ho urs	4Hour s	6Hour s	8Hou rs	10Ho urs	12Ho urs
Group A	Mea n	87.20	90.47	89.10	89.47	94.47	95.63	93.43	91.77
	S.D.	7.80	7.71	6.09	7.06	8.54	7.57	8.63	7.53
Group B	Mea n	85.00	86.70	85.47	80.67	79.80	80.03	78.60	89.73
	S.D.	8.28	7.82	8.77	6.85	6.13	8.73	7.34	7.71
p value	0.339 NS	0.065 NS	0.067 NS	0.001 S	0.000 S	0.000 S	0.000 S	0.328 NS	0.937 NS

Table 9 shows pulse rate in postoperative period in both the groups at different time interval but lower side in Group B patients as compared to Group A at 2, 4, 6 and 8 hours which was statistically significant ($p < 0.05$). There was no significant change noted at 30 min, 1 hour, 1.5 hours, 10 hours and 12 hours in postoperative period ($P > 0.05$). Table 10 : Systolic Blood Pressure (mm of Hg) in Postoperative period

Table 10 : Systolic Blood Pressure (mm of Hg) in Postoperative period

	30 Mins	1 Hour	1.5Ho urs	2Ho urs	4Hour s	6Hour s	8Hou rs	10Ho urs	12Ho urs
--	---------	--------	-----------	---------	---------	---------	---------	----------	----------

Group A	Mean	120.40	118.53	117.80	118.40	122.07	126.00	119.93	118.80	119.73
	S.D.	9.60	8.45	8.01	7.64	7.92	8.17	9.19	6.76	7.33
Group B	Mean	119.33	116.47	115.40	113.13	111.93	116.87	114.67	117.87	118.60
	S.D.	7.78	9.26	6.39	7.08	6.53	5.96	6.75	7.48	6.91
p value		0.63 NS	0.37 NS	0.29 NS	0.00 75 S	0.00 01 S	0.00 01 S	0.01 43 S	0.61 NS	0.54 NS

Table 10 shows systolic blood pressure in postoperative period in both the groups but lower side in Group B patients as compared to Group A at 2, 4, 6 and 8 hours which was statistically significant ($p < 0.05$). There was no significant change noted at 30 min, 1 hour, 1.5 hours, 10 hours and 12 hours in postoperative period ($P > 0.05$).

Table 11 : Diastolic Blood Pressure (mm of Hg) in Postoperative period

		30 Mins	1 Hour	1.5 Hours	2Hours	4Hours	6Hours	8Hours	10 Hours	12 Hours
Group A	Mean	81.33	80.10	79.33	78.87	82.27	85.33	81.53	80.40	82.60
	S.D.	6.40	6.55	6.46	6.76	6.34	5.57	4.97	5.42	6.01
Group B	Mean	80.07	78.20	77.93	72.87	72.93	74.93	75.00	78.73	80.67
	S.D.	5.95	5.95	6.98	5.42	5.58	4.98	6.80	7.60	7.73
p value		0.432 NS 2444 NS	0.244 NS	0.42 NS	0.0004 S	0.0001 S	0.0001 S	0.00 S	0.33 NS	0.284 NS

Table 11 shows diastolic blood pressure in postoperative period in both the groups but lower side in Group B patients as compared to Group A at 2, 4, 6 and 8 hours which was statistically significant ($p < 0.05$). There was no significant change noted at 30 min, 1 hour, 1.5 hours, 10 hours and 12 hours in postoperative period ($P > 0.05$).

Table 12 : Mean Arterial Pressure (mm of Hg) in Postoperative period

		30 Mins	1 Hour	1.5 Hours	2Hours	4Hours	6Hours	8Hours	10 Hours	12 Hours
Group A	Mean	94.36	92.91	92.16	92.04	95.53	98.89	94.33	93.20	94.98
	S.D.	6.54	6.47	5.61	6.10	6.05	5.22	4.92	5.39	5.67
Group B	Mean	93.16	90.96	90.42	86.29	85.93	88.91	88.22	91.78	93.31
	S.D.	4.98	4.71	5.72	4.70	3.76	4.36	5.49	6.03	5.96
p value		0.427 NS	0.187 NS	0.13 NS	0.0001 S	0.0001 S	0.0001 S	0.0001 S	0.34 NS	0.279 NS

Table 12 shows mean arterial in postoperative period in both the groups but lower side in Group B patients as compared to Group A at 2, 4, 6 and 8 hours which was statistically significant ($p < 0.05$). There was no significant change noted at 30 min, 1 hour, 1.5 hours, 10 hours and 12 hours in postoperative period ($P > 0.05$).

DISCUSSION

Cholecystectomy is a common surgical procedure done for various gall bladder disease conditions. With the advancement of surgical technique and anaesthesia, the scope of minimal access surgeries has broadened. Though Laparoscopic cholecystectomy is minimally invasive and known to cause less postoperative pain and faster recovery, pain can be attributed to incision (50-70%), visceroperitoneal pain due to stretch because of pneumoperitoneum (20-30%), hepatic bed disturbances (10-20%) because of operative procedure and shoulder pain due to diaphragmatic irritation by the residual insufflated carbon dioxide gas. Pneumoperitoneum causes

both local and systemic reaction: 1) Local effects due to peritoneal and diaphragmatic stretching, acidosis and ischemia. 2) Systemic effects due to hypercarbia causing sympathetic system stimulation with increased local tissue inflammatory response. The somatic pain is more important than visceral pain in the first 24 hours postoperative period and most common region is right upper quadrant.

The use of a TAP block for postoperative analgesia after laparoscopic cholecystectomy has become increasingly popular. Rafi et al described some "trick" points to minimize the possibility of visceral damage such as "double-pop" technique. Hebbard et al were the first mentioned the ultrasound-guided TAP block.

We enrolled 60 patients in study randomized into 2 groups 30 patients in each..

- Group A Patients received TAP block with Bupivacaine (0.25%) Total volume 20ml.
- Group B Patients received TAP block with Bupivacaine (0.25%) plus 500mg of Magnesium sulphate Total volume 20ml.

All patients in our study were demographically similar in both groups. There were no statistically significant intergroup variations regarding age, BMI, gender, ASA grading, and duration of pneumoperitoneum, surgery and anaesthesia.

Intra operative heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure, EtCO₂ and SpO₂ remained stable without any significant fluctuation in both groups.

Vas Grading In Postoperative Period At Different Time Interval

From our study, we found that, There was pain relief in both the groups at different situations like at rest, on coughing & on deep inspiration and results are comparable. The quality of pain relief was better in group B but was statistically not significant upto first two hours of postoperative period. At 2, 4, 6, and 8 hours time interval in postoperative period, patients who received MgSO₄ and Bupivacaine combination had better pain relief than Bupivacaine alone which was statistically significant.

Duration Of Effective Analgesia

Duration of effective analgesia is a time for 1st rescue analgesic requirement was calculated from the time between the end of local anaesthetic administration to the time when VAS was in category of moderate and 1st rescue analgesic was administered. VAS : (nil- 0, Mild-1 to 3, Moderate- 4 to 6, Severe- 7 to 9, Severe excruciating pain-10)

In group B duration of effective analgesia was (566.31 ± 105.48 minutes) while in group A duration of effective analgesia was (322.90 ± 97.2 minutes)

Duration of effective analgesia was longer in Group B as compared to Group A which was statistically significant (p value < 0.0001).

Total Diclofenac Sodium Consumption In Postoperative Period

Single dose of Inj. Diclofenac sodium was given in 40% of the patients in Group A and in 73.33% of the patients in Group B. Second dose was given in 60% of the patients in Group A and in 13.33% of the patients in Group B. Total Diclofenac Sodium consumption in postoperative period was lower in patients who received MgSO₄ with bupivacaine compared to patients who received Bupivacaine alone which was statistically significant (p value= 0.002).

Postoperative Hemodynamics At Different Time Interval:

From the above study, we can infer that, better postoperative hemodynamic parameters achieved with the patients who received ultrasound guided TAP block with Magnesium sulphate as an adjuvant to bupivacaine.

CONCLUSION

To conclude, Ultrasound guided right subcostal Transversus Abdominis Plane block is safe and feasible technique to practise for postoperative analgesia in Laparoscopic cholecystectomy. Addition of Magnesium sulphate 500 mg as an adjuvant to Bupivacaine (0.25%) 20 ml provides better analgesia, longer duration of effective analgesia, better hemodynamic stability and requires less analgesic consumption in postoperative period.

REFERENCES

1. Ultrasound-Guided Transversus Abdominis Plane Block for Analgesia in Laparoscopic Cholecystectomy: A Systematic Review and Meta-Analysis *Med Princ Pract.* 2016;25(3):237-46. doi: 10.1159/000444688. Epub 2016 Feb 16
2. Comparison of ultrasound-guided transversus abdominis plane block with bupivacaine and ropivacaine as adjuncts for postoperative analgesia in laparoscopic cholecystectomies. Sinha S, et al. *Indian J Anaesth.* 2016 *Indian J Anaesth.* 2016 Apr;60(4):264-9. doi: 10.4103/0019-5049.179464 Year: 2016 | Volume: 60 | Issue: 4 | Page: 264-269
3. Al-Refaey K, Usama EM, Al-Hefnawey E. Adding magnesium sulfate to bupivacaine in transversus abdominis plane block for laparoscopic cholecystectomy: A single blinded randomized controlled trial. *Saudi J Anaesth.* 2016;10(2):187-191. doi: 10.4103/1658-354X.168821
4. Ultrasound-guided transversus abdominis plane block in patients undergoing laparoscopic cholecystectomy: comparison of efficacy of bupivacaine and levobupivacaine on postoperative pain control *Rev Bras Anesthesiol.* 2018 Sep - Oct;68(5):455-461. doi: 10.1016/j.bjan.2018.02.004. Epub 2018 Jun 22
5. Brown's Atlas Of Regional Anaesthesia EhabFarag, Loran Mounir-Soliman Fifth Edition Section VI Truncal blocks Chapter no: 40 Page no:249
6. Morgan&Mikhail's Clinical Anaesthesiology Fifth Edition Chapter no:46 peripheral nerve blocks page no:1021
7. Analgesic effects of ultrasound-guided transverse abdominis plane block using different volumes and concentrations of local analgesics after laparoscopic cholecystectomy *J Int Med Res.* 2017 Feb; 45(1):211-219. doi:10.1177/0300060516682883. Epub 2017 Jan 17
8. Efficacy of Ultrasound guided transverse abdominis plane block for postoperative analgesia in laparoscopic cholecystectomy, a prospective randomised controlled trial 2017 northern journal of ISA (A publication of Indian society of Anaesthesiologist)
9. Magnesium sulphate as an adjuvant to bupivacaine in ultrasound-guided transversus abdominis plane block in patients scheduled for total abdominal hysterectomy under subarachnoid block *Indian J Anaesth [serial online]* 2016 [cited 2019 Oct 19];60:174-9. Available from: <http://www.ijaweb.org/text.asp?2016/60/3/174/177879>
10. ADDING MAGNESIUM SULFATE TO BUPIVACAINE IN TRANSVERSUS ABDOMINIS PLANE BLOCK FOR LAPAROSCOPIC CHOLECYSTECTOMY: A SINGLE BLINDED RANDOMIZED CONTROLLED TRIAL. *SAUDI J ANAESTH.* 2016 APR-JUN;10(2):187-91. DOI: 10.4103/1658-354X.168821.
11. MAGNESIUM: A VERSATILE DRUG FOR ANESTHESIOLOGISTS. *Korean J Anesthesiol.* 2013 Jul;65(1):4-8. doi: 10.4097/kjae.2013.65.1.4. Epub 2013 Jul 19.