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RESEARCH ARTICLE

EFFICACY OF PRE-EMPTIVE ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK WITH DEXAMETHASONE ADDED TO BUPIVACAINE FOR POSTOPERATIVE ANALGESIA AFTER LAPAROSCOPIC SURGERIES

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Abstract

Background: Laparoscopic surgeries are commonly performed surgical procedures in day-to-day practice. These patients require a multimodal postoperative pain treatment regimen that provides high-quality analgesia with minimal side effects. TAP block is a regional anaesthetic technique that has been applied as one segment of a multimodal pain regimen in abdominal surgeries. Addition of dexamethasone as adjuvant to bupivacaine in TAP block provides prolonged post-operative analgesia and better pain control than LA alone. Also reduces the incidence of PONV.

Aim of the study: To observe and compare the analgesic effect of ultrasound guided TAP (transversus abdominis plane) block using 0.25% bupivacaine with dexamethasone versus 0.25% bupivacaine with normal saline. Evaluate efficacy of TAP block in providing postoperative analgesia in laparoscopic surgeries. To study the adverse effects of the drug.

Methodology:

• **Study Design:** Prospective randomized single blind control trial
• **Study population:** 70 adult patients of ASA I and II scheduled to undergo laparoscopic surgeries under general anaesthesia
• **Study location:** Basaveshwar Teaching and General Hospital, Kalaburagi
• **Duration of study period:** 6 months (20th Jan 2024 to 20th July 2024)

Inclusion criteria:

- Patients between 18–60 years of age
- Patients belonging to ASA grade I, II
- Patients with BMI < 30 kg/m²

Exclusion criteria:

- Infection at local site
- Patient with hypersensitivity to drug
- Patient refusal
- Patient's inability to describe postoperative pain to investigator (dementia, delirium, psychiatric and neurological disorder)

- Pregnant patient
- Patients with BMI > 30 kg/m²

Sample size:

- 70 patients of both genders randomly divided into two groups of 35 each (by computer-generated random numbers).
- With anticipated Mean difference of Visual Analogue Scale as 0.3 between Normal Saline and Dexamethasone group, anticipated standard deviation as 0.46, the minimum sample per group is 40 with 80% power and 10% level of significance.

Formula used:

- $n = (Z\alpha + Z\beta)^2 \times 2 \times SD^2 / Md^2$
- Z = statistic at a level of significance
- Md = anticipated mean difference
- SD = anticipated standard deviation

Statistical tests used: Chi-square test, ANOVA test, Mean ± SD

PRIMARY STUDY CRITERIA

• To observe and compare the analgesic effect of ultrasound guided TAP (transversus abdominis plane) block using 0.25% bupivacaine with dexamethasone versus 0.25% bupivacaine with normal saline

SECONDARY STUDY CRITERIA

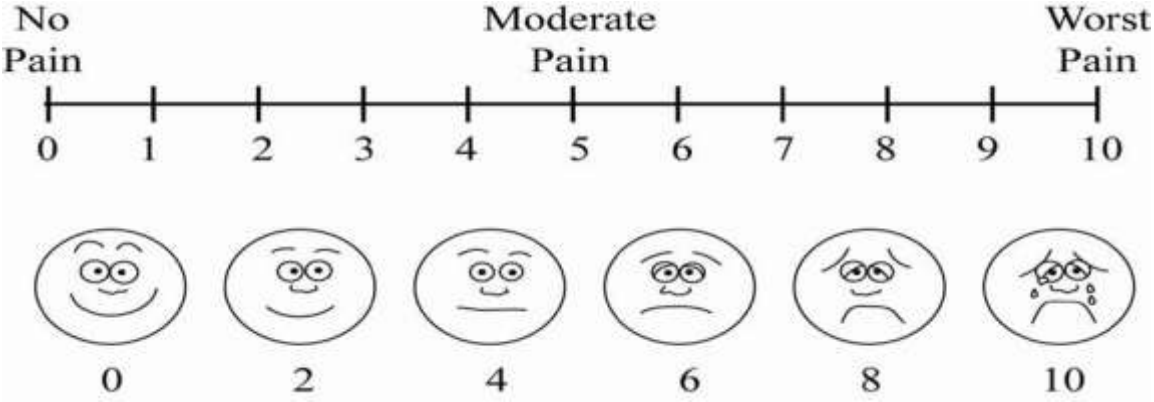
• To evaluate efficacy of TAP block in providing postoperative analgesia in laparoscopic surgeries
• To study the adverse effects of the drug
• Institutional Ethical Committee clearance obtained
• Informed written consent taken, pre-anaesthetic evaluation done, and routine investigations obtained
• Patients were randomly divided into two groups of 35 each — Group 1 and 2 by drawing out any one of the 2 labelled cards (A and B) from a sealed envelope

- **Group 1:** TAP block (after induction of General Anaesthesia) with 15 ml 0.25% Bupivacaine and Dexamethasone 8 mg
- **Group 2:** TAP block (after induction of General Anaesthesia) with 15 ml 0.25% Bupivaca

Procedure:

- At the preoperative visit on the evening before surgery, the VAS scale scoring system was explained to all patients. Written informed consent was obtained from all patients.
- All the patients received a standardized general anaesthesia as per institute protocol.
- For TAP block, the skin was prepared with 10% Betadine solution and a high-frequency ultrasound probe was placed horizontally across the abdomen. The muscle layers in the antero-lateral part of the abdomen were traced by scanning from the midline towards the area between the iliac crest and the costal margin in the mid-axillary line.
- The rectus abdominis muscle was identified, just off the midline, as an oval/elliptical structure. The ultrasound transducer was moved to scan laterally where the 3 muscle layers could be seen running parallel to one another.
- With an adequate ultrasound image, the regional block needle was inserted anterior to the transducer. The needle was placed in the transversus abdominis plane and 2 ml of 0.9% normal saline was given, and splitting of the plane was confirmed before injecting 15 ml of 0.25% bupivacaine (with dexamethasone or normal saline) slowly. After injection, the fascial plane was seen to separate and form a well-defined hypoechoic elliptical shape between the internal oblique and transversus abdominis muscles.
- Patient's baseline vital parameters (heart rate, blood pressure, oxygen saturation) were noted during surgery, every fifteen minutes for the first hour, and later every three hours after surgery, for 24 hours.
- After completion of the surgical procedure and emergence from anaesthesia, patients were transferred to the postoperative recovery room for further monitoring of postoperative pain.
- In postoperative recovery room, all patients were monitored for heart rate, blood pressure, oxygen saturation, pain (VAS) and PONV.
- **Rescue analgesia**: Inj. Paracetamol (1 gm) intravenously every 8 hrs and Inj. Pentazocine (30 mg) intramuscularly in case of visual analogue scale (VAS) ≥ 4.

- Time at which patient demanded rescue analgesia was noted and the VAS score at that time was also noted.



ANALYSIS OF DATA

- Statistical data was analysed using SPSS 16.0 version software.
- For non-continuous data, chi-square test was applied.
- The mean and standard deviation of the parameters studied during observation period were calculated for two treatment groups and compared using Student's 't' test.
- If the P value is < 0.05, it is considered as significant.

Results:

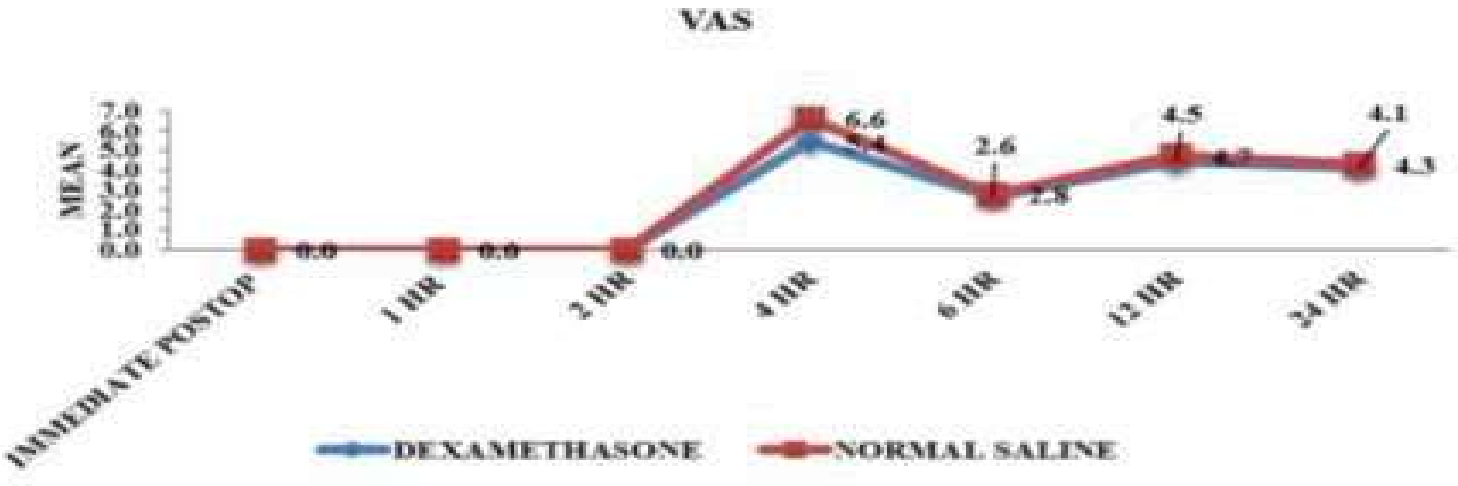
- Distribution of cases according to sex between study groups
- Distribution of cases according to ASA class between study groups

Sex	Study (N=35)		Control (N=35)		p value
	N	%	N	%	
Male	22	62.9	14	40.0	0.056
Female	13	37.1	21	60.0	
Total	35	100.0	35	100.0	

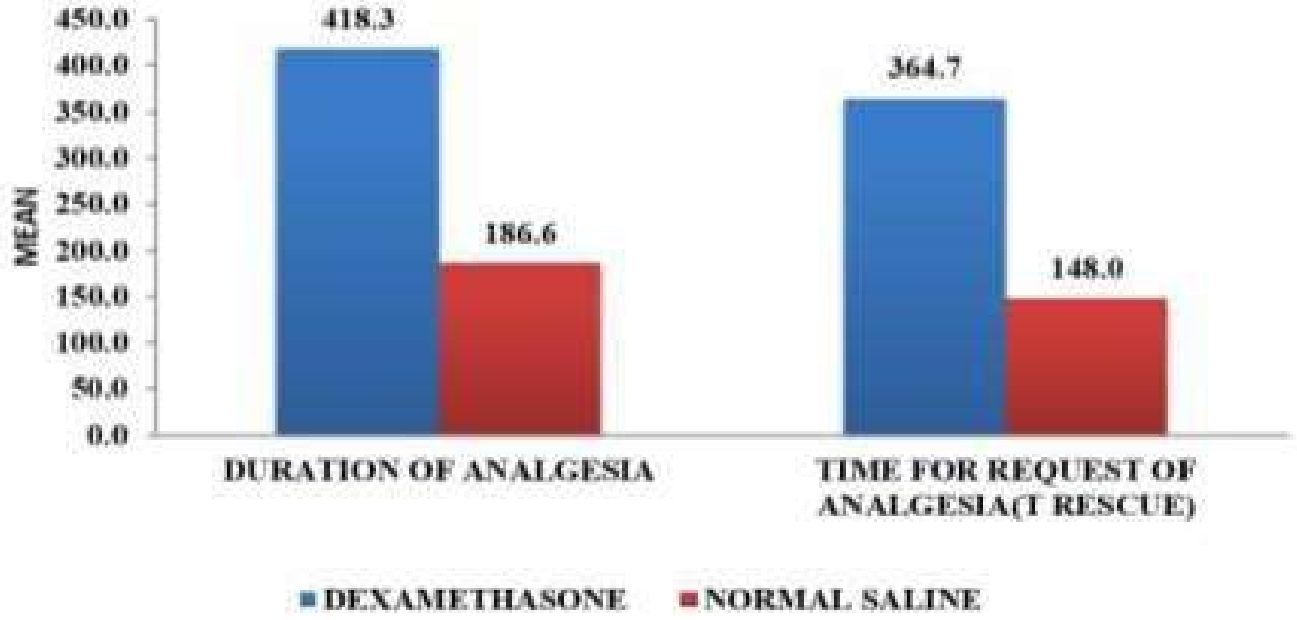
- Comparison of mean duration between study groups

Duration	Study		Control		p value
	Mean	SD	Mean	SD	
Total duration surgery	89.6	17.6	84.1	7.0	0.094

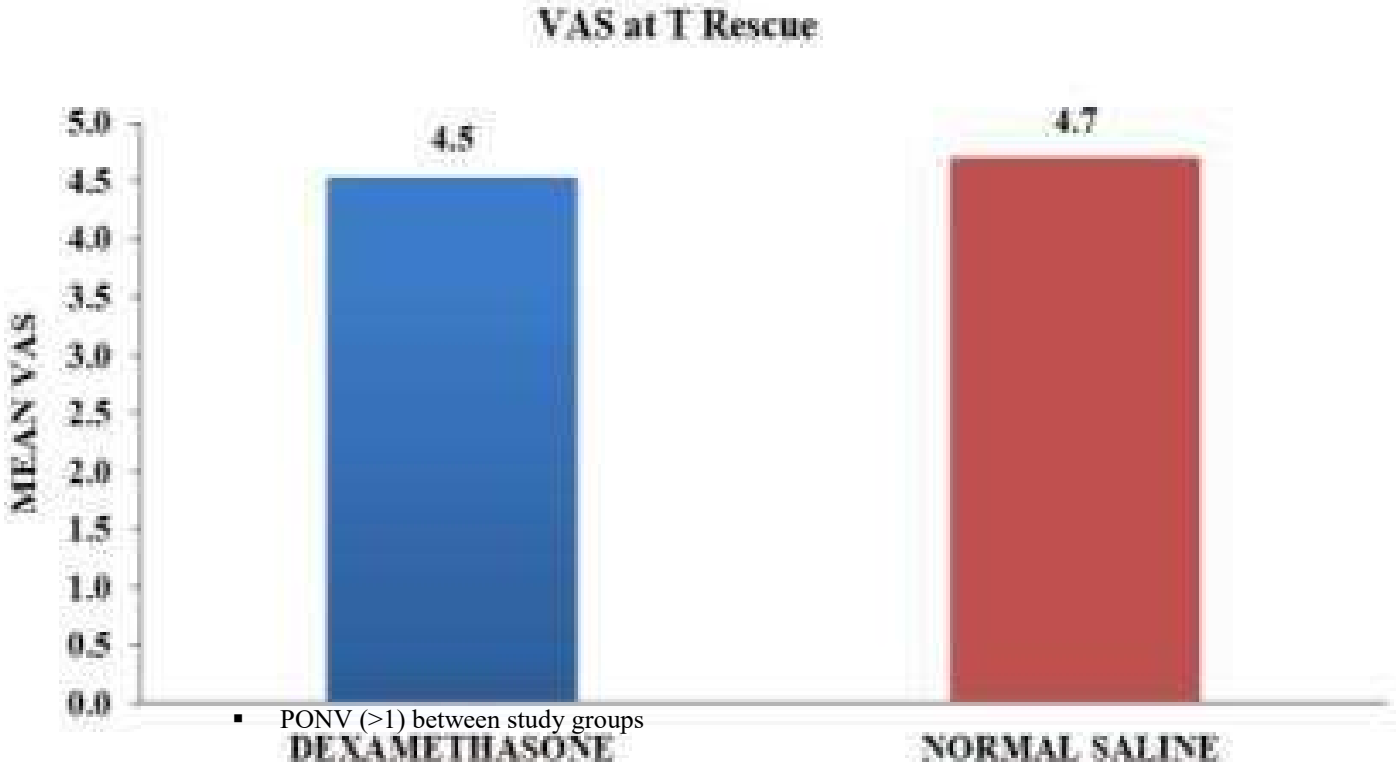
- Comparison of mean VAS according to time



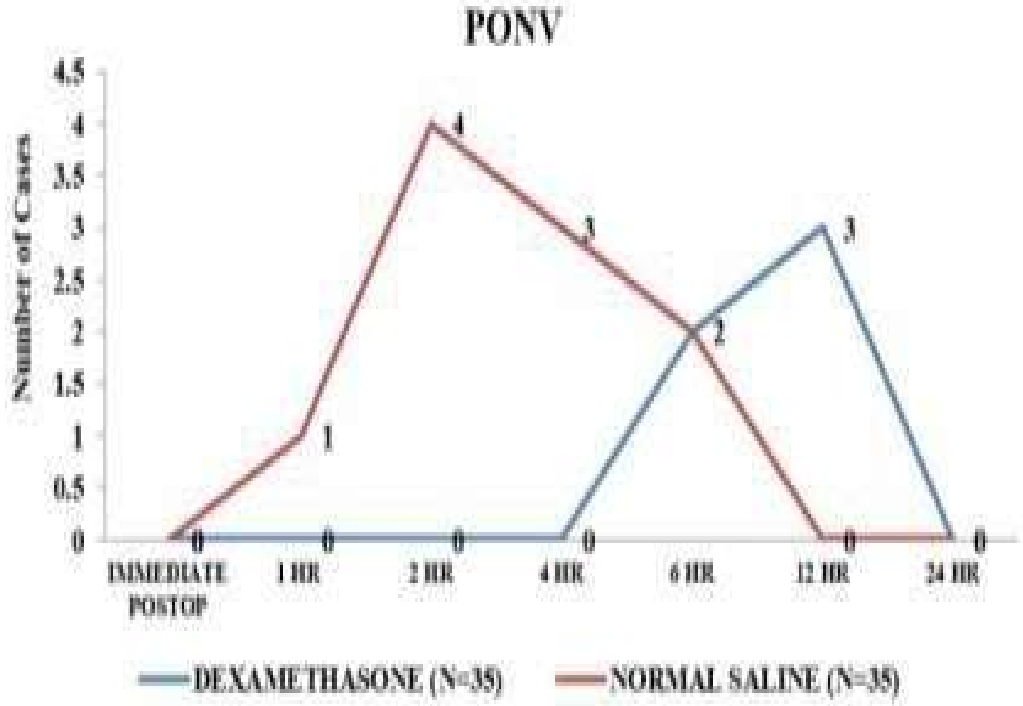
- Comparison of mean parameters according to time



- Comparison of mean VAS at rescue according to time



- PONV (>1) between study groups



Discussion:

- TAP block with dexamethasone as an adjuvant added to bupivacaine, when used as a part of multimodal analgesia, provides effective analgesia for patients undergoing laparoscopic surgery. It reduced the intensity of breakthrough pain and requirement of opioids postoperatively. All blocks were done under ultrasound guidance which ensured the exact location. There was no block-related complication.
- Substantial component of pain experienced by the patient is from abdominal wall incision in abdominal surgeries. Any interventions that block pain from abdominal wall will provide good post-operative pain relief. So, a multimodal analgesia regimen is needed for providing effective postoperative pain relief. Adding dexamethasone to the block increases the duration of the block thereby providing increased duration of analgesia and reduced incidence of PONV.

Conclusion:

- TAP Block is easy to perform under ultrasound guidance without complication and it provides effective analgesia. Adding dexamethasone as an adjuvant to TAP block produces immense post-operative analgesia with concomitant increase in duration of analgesia, reduced VAS score, and rescue analgesic dose requirements. It also reduces PONV considerably.

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