European Journal of Molecular & Clinical Medicine

ISSN 2515-8260 Volume 11 Issue 5, 2024

DOI: 10.53555/ejmcm/2024.11.05.10

Original Research Paper

"THE EFFECT OF TWO DIFFERENT DOSES OF DEXAMETHASONE ON BLOOD SUGAR LEVELS WHEN ADDED AS ADDITIVE TO LOCAL ANAESTHETIC IN TRANSVERSALIS FASCIA PLANE BLOCK IN CAESAREAN SECTION SURGERIES- AN OBSERVATIONAL STUDY"

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ABSTRACT:

Background: Corticosteroids are being widely used as adjuvants to local anaesthetics for peripheral nerve and fascial plane blocks as they increase the duration of analgesia. They are known to cause rise in glycemic profile even in non-diabetics. So we aimed to study the effect of two doses of dexamethasone on the glycemic profile when added as additive to local anaesthetic in transversalis fascia plane block.

Aim: To study the effect of two different doses of dexamethasone on blood sugar levels when added as additive to local anaesthetic in transversalis fascia plane block in caesarean section surgeries.

Methodology: After obtaining ethical committee approval, a prospective observational study was conducted on 60 parturients undergoing elective caesarean section, studied as two groups with 30 in each group. Spinal anaesthesia was given for all the parturients and Transversalis fascia plane block was given with 0.125% levobupivacaine 30 ml for postoperative analgesia. Group A(n=30) received 8mg dexamethasone and group B (n=30) received 4mg dexamethasone as adjuvant in transversalis fascia plane block. The primary outcome was to compare the blood sugar levels preoperatively, 2h post-surgery, FBS on Post operative day (POD) 1,2,3. The secondary outcomes were assessment of surgical site infection after 1 month, VAS scores at 6h, 12h and 24h postoperatively and time for first rescue analgesia between both groups.

Results: The blood sugar levels preoperatively, 2h post-surgery, on POD 1,2,3 did not show any statistical significance between the two groups p= 0.149, p=0.284, p=0.417, p=0.549, p= 0.417 respectively). The VAS scores were not significant at 6h and 12 hr (p= 0.157, p= 0.230 respectively) but statistical significance was noted at 24h (p< 0.0001). The time for first recue analgesia was significantly lower in group B (18.52 ±4.702) compared to group A (15.98 ±4.650). Surgical site infections were not noted in both the groups.

Conclusion: Dexamethasone at a dose of 8mg is superior to 4mg for postoperative pain relief but the increase postoperative blood sugars is similar in both the doses of dexamethasone.

Keywords: Transversalis fascia plane block (TFP block), blood sugars, surgical site infection.

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INTRODUCTION:

One of the most often used adjuvants in fascial plane blocks is dexamethasone. As perioperative steroids enhance insulin resistance and diminish pancreatic beta-cell activity, blood glucose levels may rise above commonly accepted inpatient goals[1]. Given that dexamethasone has a longer biological half-life (36 to 54 hours)[2], there are few prospective studies that examine the long-term effects of dexamethasone on perioperative blood glucose levels for the whole duration.

The transversalis fascia plane (TFP) block[3] is an ultrasound-guided regional anesthetic technique that targets the T12 and L1 spinal nerves by injecting local anesthesia below the transversalis fascia. It is one of the analgesic options following caesarean sections. Hebbard[4] described TFP block in the year 2009.

We hypothesized that 8mg dexamethasone might increase perioperative blood sugar levels compared to 4mg dexamethasone when added to local anaesthetic in fascial plane block and so we compare the effects of the use of 8 mg dexamethasone versus 4 mg as an adjuvant to 0.125% levobupivacaine on blood sugar levels and surgical site infection in parturients undergoing elective caesarean section surgeries.

MATERIALS AND METHODS:

The study was conducted in Department of Anaesthesiology, Narayana Medical College and Hospital after obtaining institutional ethics clearance (IEC/NMC/29.04.2023/130). This trail was registered with Clinical Trials Registry- India (CTRI/2023/11/059419). 60 patients with ASA II status undergoing elective caesarean section surgeries were studied as 2 groups after obtaining informed and written consent. This study was conducted from January 2024 to June 2024. Parturients weighing 40-70 kg, BMI<35kg/m2, aged between 20- 40years and belonging to American Society Of Anaesthesiologists (ASA) II listed for elective Caesarean section were included. Patients who refused to participate, ASA III and IV, BMI>35kg/m2, use of oral anticoagulants, allergy to study drugs, local infection and severe psychiatric disorders were excluded from the study. After thorough pre-anaesthetic evaluation, patient was shifted to operation theatre, all ASA standard monitors were connected and a standardized anesthetic technique was followed. Spinal anesthesia was administered in the sitting position. Using an aseptic technique, a 25-gauge Quincke needle was inserted through a midline approach into the L2–L3 or L3–L4 interspace. Anesthesia was established with a single bolus of 0.5% hyperbaric bupivacaine 10 mg and buprenorphine 60 mcg. The level of sensory blockade was assessed regularly by the level of touch sensation before surgical incision (T6–T8 was considered adequate). Intraoperative vitals were monitored. After completion of surgery, bilateral transversalis fascia plane block was performed in supine position under ultrasound guidance (Sonosite M turbo) with linear probe by injecting local anaesthetic deep to the transversalis fascia using 100 mm 20G needle. Total volume of 30ml was given on each side. Patients who received transversalis fascia plane block with 0.125% levobupivacaine and dexamethasone 8mg were included in Group-A. Patients who received transversalis fascia plane block with 0.125% levobupivacaine and dexamethasone 4mg were included in Group-B. Our primary objective was to measure point of care blood glucose before administration of spinal anaesthesia, 2 hours postoperatively and fasting blood sugars on postoperative day 1, 2 and 3 using an Accu-Chek® Active (Roche Diagnostics GmbH, Mannheim, Germany) glucometer that was calibrated daily. Postoperatively, patients were administered dextrose-free IV fluids till the study ended. Our secondary objectives were to assess for postoperative pain using VAS scores at 6h, 12h, 24h and time for first rescue analgesia was noted (VAS 2 or more). Paracetamol 1 gram iv was given as rescue analgesic. Surgical site infection if any, was noted after 1 month.

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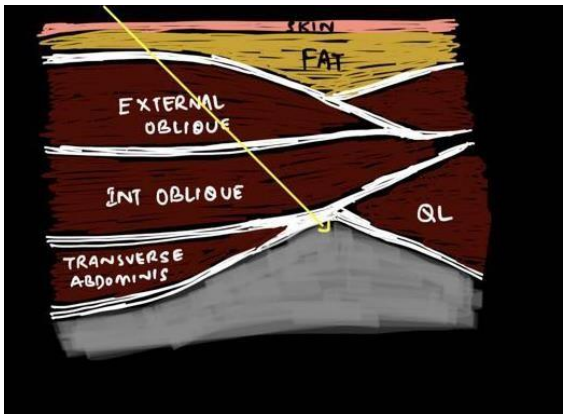

Figure 1: Transversalis fascia plane

Figure 2: Ultrasound image of transversalis fascia plane

Figure 3: Local anaesthetic deposition on ultrasound

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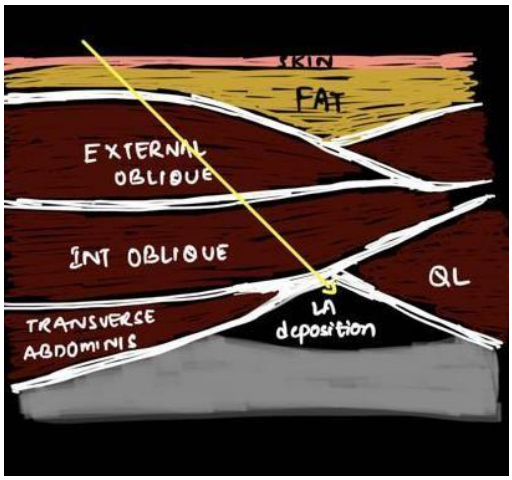
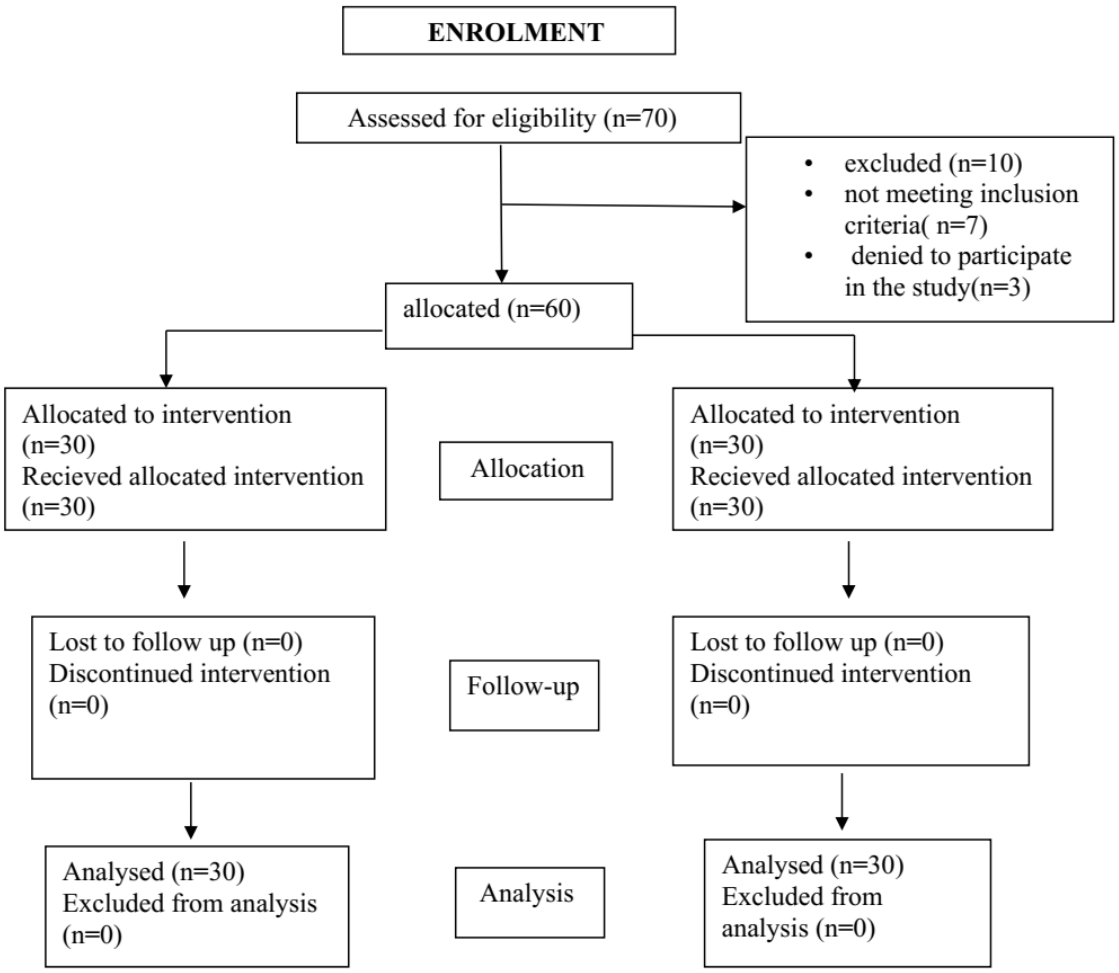


Figure 4: Diagrammatic representation local anaesthetic deposition

DATA ANALYSIS:

All recorded data was entered into MS excel software and analysed by using SPSS software version 16. Results were expressed in mean, standard deviation and percentages. And for statistical difference student t- test was done. P value <0.05 was considered significant.



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RESULTS:

Table 1. Demographics of parturients of group A and group B

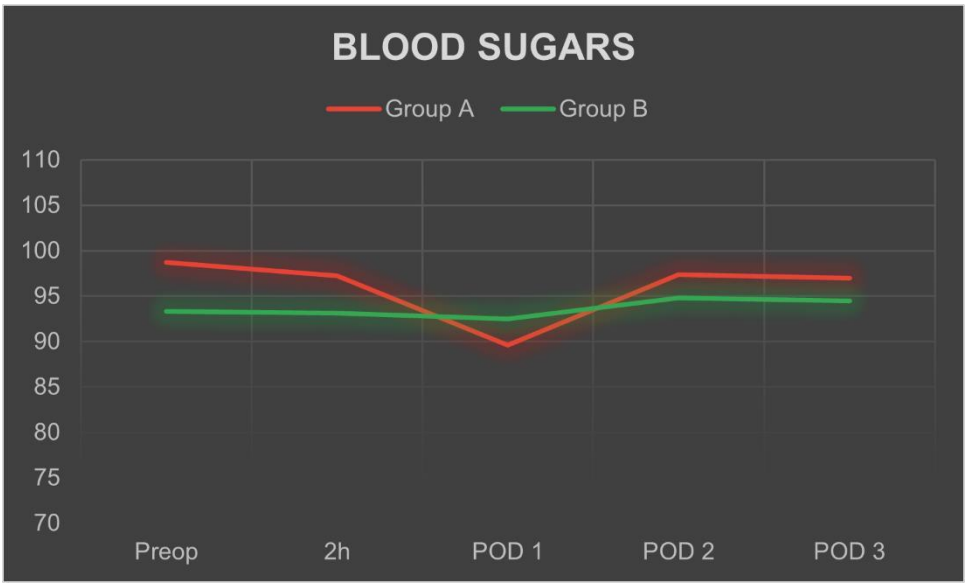
Demographic data	Mean and SD for group A	Mean and SD for group B	P - value	Significance
Age	24.16± 3.667	25.56± 3.147	0.118	Not significant
BMI	27.91 ±3.689	28.16± 3.504	0.7806	Not significant

Our study did not show any statistical significance in terms of parturients' age and BMI.

Table 2. Blood sugars of group A and group B parturients

Blood sugars	Mean and SD for group A	Mean and SD for group B	P - value	Significance
Preoperative	98.73±13.059	93.3±15.638	0.149	Not significant
2 hrs postop	97.26±15.695	93.13±13.85	0.284	Not significant
POD 1 FBS	89.63±14.099	92.5±13.242	0.417	Not significant
POD 2 FBS	97.36±13.639	94.8±18.943	0.549	Not significant
POD 3 FBS	97±13.333	94.5±10.146	0.417	Not significant

In the present study, we found that effect of addition of 8mg vs 4mg dexamethasone to levobupivacaine as an adjuvant on blood sugar levels did not show any statistical significance (p value > 0.05). Preoperatively, mean blood sugars in group A were 98.73±13.059 mg/dl and group B were 93.3±15.638 mg/dl (p=0.149). 2h post operatively mean blood sugars in group A were 97.26±15.695 mg/dl and group B were 93.13±13.85 mg/dl (p= 0.284). FBS on POD 1 in group A were 89.63±14.099 mg/dl where as in group B they were 92.5±13.242 mg/dl (p=0.417). FBS on POD 2 in group A were 97.36±13.639 mg/dl where as in group B they were 94.8±18.943 mg/dl (p=0.549). FBS on POD 3 in group A were 97±13.333 mg/dl where as in group B they were 94.5±10.146 mg/dl (p=0.417).



GRAPH 1: BLOOD SUGAR PROFILE

Surgical site infection

There were no cases of surgical site infection noted one month after caesarean section

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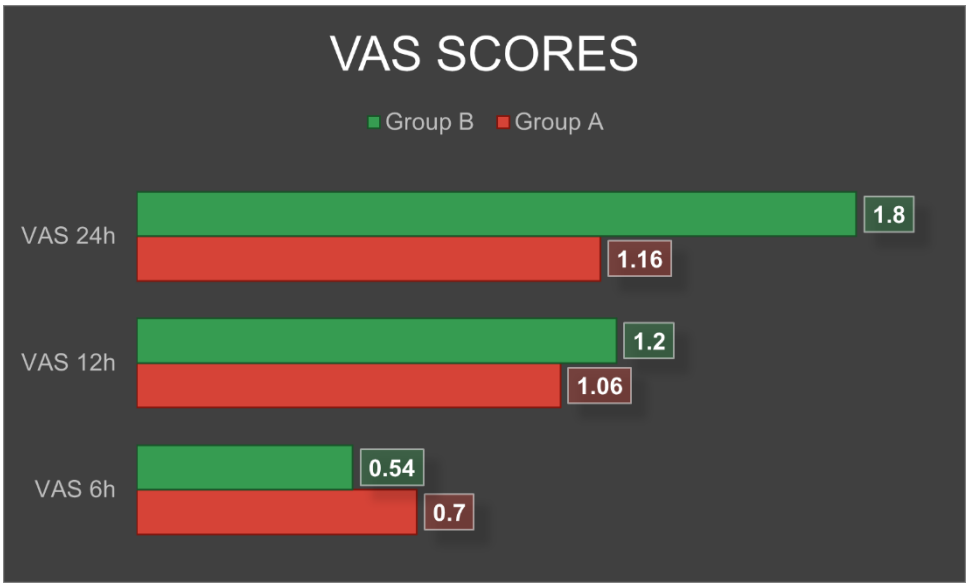
Table 3. VAS score of group A and group B parturients

VAS SCORE	Mean and SD for group A	Mean and SD for group B	P - value	Significance
6 hrs	0.7 ±0.534	0.9 ±0.547	0.157	Not significant
12 hrs	1.06 ±0.520	1.26 ±0.739	0.230	Not significant
24 hrs	1.16 ±0.461	1.8 ±0.664	0.0001	Significant

In the present study, we found that VAS score at 6th, 12th hour after surgery did not show statistical significant association (p >0.05), whereas 24 hour VAS scores were lower in group A 1.16 ±0.461 compared to group B 1.8 ±0.664 and showed statistical significance (p value = 0.0001).

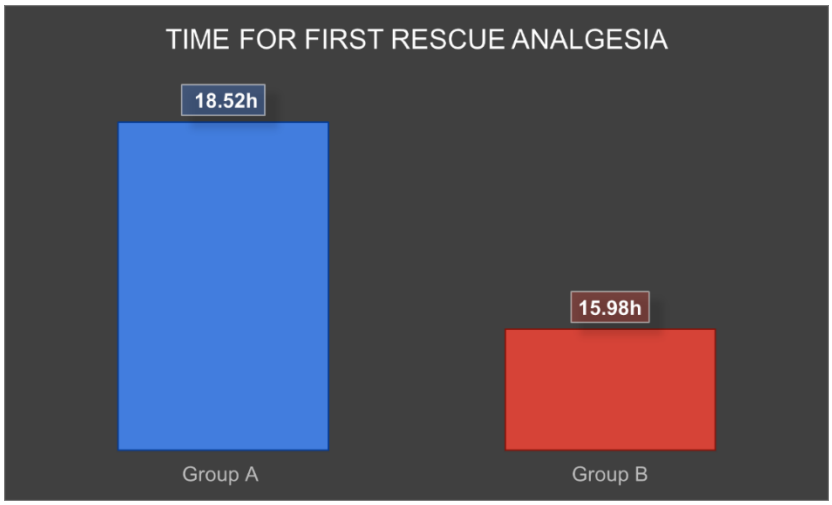


GRAPH 2: VAS SCORES

Table 4. Time for 1st rescue analgesia among group A and group B parturients

Parameter	Mean and SD for group A	Mean and SD for group B	P - value	Significance
Time for 1st rescue analgesia (hours)	18.52 ±4.702	15.98 ±4.650	0.0397	Significant

The time taken for first rescue analgesia is 18.52 ±4.702 hrs in group A compared to group B which is 15.98 ±4.650 hrs and showed statistical significant association (p<0.05).



GRAPH 3: TIME FOR FIRST RESCUE ANALGESIA

DISCUSSION:

Perineural dexamethasone at different dosages is now utilised in peripheral nerve blocks to prolong analgesia[1]. Determining the ideal perineural dexamethasone dosage for peripheral nerve blocks is important because of the possible neurotoxicity associated with excessive doses of this drug which will prolong analgesia and reduce the likelihood of side effects. There are very limited studies on the effect of dexamethasone on the glycemic profile when given in fascial plane blocks.

It is still unknown what mechanisms underlie the advantageous effects of dexamethasone and how it should be administered[5]. There have been suggestions that the impact is accomplished by upregulating potassium channels, decreasing the release of inflammatory mediators and ectopic neuronal firing, and directly blocking transmission in nociceptive C-fibres.

When combined with LA alone, dexamethasone may allow patients who would not otherwise be qualified for prolonged, continuous perineural procedures to benefit from a lengthier period of analgesia[6]. The other adjuvants being used are dexmedetomidine, buprenorphine, magnesium sulphate.

After CS, multimodal analgesia has been the norm for managing postoperative pain[7]. Because the transversalis fascia plane block is a more posterior block, it has a greater chance of blocking the ilio-inguinal, illiohypogastric, and subcostal nerves and probable spread to the paravertebral space similar to quadratus lumborum block thereby providing visceral analgesia to some extent. Consequently, it has been evaluated recently for the management of postoperative pain after CS and has proven to be more effective than transverse abdominis plane (TAP) block, ilio inguinal and iliohypogastric nerve (ILIH) block and conventional multimodal analgesia that makes use of systemic analgesics[7].

Acharya, et al[8] conducted a study to compare the effects of adding two different doses of dexamethasone on the quality and duration of the fascia iliaca block(FIB) in patients undergoing surgery for proximal femur fractures. The study found that when dexamethasone is used as an adjuvant with levobupivacaine in the FIB, 8 mg is preferable to 4 mg. Even though they both reduced the need for oral and intravenous analgesics and extended analgesia, 8 mg of dexamethasone was suggested as a more effective adjuvant to local anaesthetics in the FIB.

The results were similar to that of our study in terms of duration of analgesia and time for first rescue analgesia

Peter, et al[2] conducted a study to assess the length of hospital stay, pain, surgical site infection (SSI), and postoperative glycaemic profile following a single intraoperative intravenous dexamethasone dose (0.15 mg/kg) in non-diabetic patients. The study's findings included the finding that even a single

dose of dexamethasone in non-diabetic adults causes significant and prolonged postoperative hyperglycaemia.

Till date no studies have compared the effect of dexamethasone on the glycemic profile when added as additive in fascial plane blocks. We have studied the effect of addition of two different doses of dexamethasone in transversalis fascia plane block and found no significant increase in blood sugars in both the groups postoperatively.

CONCLUSION:

Our study has concluded that there is no significant increase in postoperative blood sugar levels after administration of different doses of dexamethasone as additive in transversalis fascia plane block and there were no reports of surgical site infection. VAS scores at 24 hours were significantly lower in parturients who received 8mg dexamethasone as adjuvant in block. Thus 8mg dexamethasone can be preferred to 4mg dexamethasone in fascial plane blocks as adjuvant owing to its better analgesic profile with no effect on blood sugar levels.

DECLARATIONS

Funding: No funding sources.
Conflict of interest: None.

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