



Effect of intravenous dexamethasone as adjuvant therapy in pain management for post-cesarean section patients based on visual analog scale (VAS)

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Abstract

This research purposed to determine effect of intravenous dexamethasone as adjuvant therapy in pain management for post-cesarean section patients based on visual analog scale (VAS). This research is an experimental study with post test only control group design at Department of Obstetrics and Gynecology Sundari General Hospital Medan from August 2021 until sample was fulfilled. Pregnant patients who will undergo cesarean section are given 10 mg intravenous dexamethasone single dose in 100 ml 0.9% NaCl immediately prior to spinal anesthesia. The examination was performed using visual analog scale (VAS) Wong-Baker Faces Pain Rating Scale at 4, 12, 24 and 48 hours after cesarean section at rest and activity. To analyze data in unpaired group T test will be used and data in paired groups, Anova test will be used. All results are declared significant if p value <0.05. There was a statistically significant differences VAS scores between dexamethasone and placebo group and VAS scores at rest and during activity was significantly reduced by given IV dexamethasone at 4, 12, 24 and 48 hours after cesarean section and significantly

Keywords : pain management, intravenous dexamethasone, caesarean section, visual analog scale

I. INTRODUCTION

Dexamethasone is strong anti-inflammatory agent, which can be used as short-term postoperative pain control in various surgery. Dexamethasone has an anti-emetic effect in addition to its anti-inflammatory and analgesic effects. Dexamethasone mechanism of action is not fully understood, but hypothetical theory proposes that there is inhibition production of pain mediators (prostaglandins and bradykinins) and inhibition of pain threshold reduction by dexamethasone during surgery, thereby reducing tissue swelling, that will inhibit nerve compression by inflamed tissue and ultimately reduce pain.¹

Parthasarathy et.al investigated effect of intravenous dexamethasone single dose on postoperative pain and Post-Operative Nausea and Vomiting (PONV) in patients undergoing surgery under spinal anesthesia. Dose of dexamethasone used was 8 mg and was given immediately after spinal anesthesia. The variables observed were mean arterial pressure (MAP), heart rate, respiratory rate, and pain scale based on a visual analog scale and symptoms of nausea and vomiting during first 24 hours after surgery. It was concluded that dexamethasone was effective in reducing postoperative pain, need for other analgesics on first postoperative day, and PONV incidence compared to controls (without dexamethasone).² Mohtadiet al.'s study. suggested that dexamethasone single dose can significantly reduce post-laparoscopic cholecystectomy pain compared to placebo.³ Cardoso study proved that dexamethasone is also useful for preventing PONV after cesarean section.⁴

II. RESEARCH METHODOLOGY

This research is an experimental study with post test only control group design at Department of Obstetrics and Gynecology Sundari General Hospital Medan from August 2021 until sample was fulfilled. The research sample were forty pregnant women in Obstetrics and Gynecology Treatment Room at Sundari General

Hospital Medan for each group who met inclusion criteria, namely term pregnant women, who will undergo cesarean section under spinal anesthesia, with plan for cesarean section for first time and history of one cesarean section, without hypersensitivity or allergy to dexamethasone, without cognitive decline, without peptic ulcer disease, without glaucoma, without diabetes mellitus type 1 or 2, without heart failure, without systemic viral and fungal infections, without hypertension or other uncontrolled disease, without history of 2 cesarean sections, not in preterm pregnancy and patient agree to participate by signing an informed consent; and exclusion criteria were patients with obstetric emergencies and who experienced persistent or increasing VAS during 4, 12, 24, and 48 hours evaluation after cesarean section. Sampling was done with consecutive sampling technique.

Pregnant patients who will undergo cesarean section are given 10 mg intravenous dexamethasone single dose in 100 ml 0.9% NaCl immediately prior to spinal anesthesia. The examination was performed using visual analog scale (VAS) Wong-Baker Faces Pain Rating Scale. Researchers prepared VAS Wong-Baker Faces Pain Rating Scale card which contained a scale from 0 – 10 with two ends each describing “no pain” and “very severe pain”. Patients were asked to tell how much pain they felt on scale of 0 to 10. This examination was performed at 4, 12, 24 and 48 hours after cesarean section at rest and activity.

For Mean VAS value at each hour of measurement, it is displayed in form of mean value and standard deviation. Then analysis continued with Kolmogorov Smirnow normality test. To analyze data in unpaired group and data are normally distributed, T test will be used, while Mann Whitney test will be used for for abnormally distributed data. Meanwhile, to analyze data in paired groups and normally distributed data, Anova test will be used, while Kruskal Wallis test will be used for abnormally distributed data. All results are declared significant if p value <0.05.

III. RESULTS

Mean age of research sampel was 26 years old, and mean gestational age was 38 weeks (term). Majority of subjects were 73.2% multipara and 53.8% never had cesarean section history. Surgery duration was less than 90 minutes as many as 82.5%. Mean upper arm circumference was 30 cm.

Table 1. Research Samples Characteristics

Characteristics	N=80
Age	26,57 ± 4,33
Gestasional age	38,08 ± 0,91
Parity	
Nullipara	21 (26,2)
Multipara	59 (73,2)
Caesarean Section history	
No	43 (53,8)
Yes	37 (46,3)
Surgery duration`	
<90 minutes	66 (82,5)
>90 minutes	14 (17,5)
Upper Arm Circumferences	30,37 ± 4,03

Table 2. Characteristics of research subject's vital sign parameters after cesarean section

Groups	Duration (hours)	MAP	HR	RR
Intravenous Dexamethasone	4	93 (86-110)	86 (82-108)	18(16-24)
	12	86 (83-106)	82 (80-98)	18 (16-22)
	24	83 (83-96)	80 (76-92)	18 (16-20)
	48	83 (83-93)	76 (72-86)	18 (16-20)
Control	4	108 (103-116)	95 (92-110)	23 (20-26)
	12	100,5 (96-110)	93 (90-104)	20 (18-24)
	24	99,5 (93-106)	90 (86-98)	18 (16-22)
	48	91 (86-103)	84 (80-92)	18 (16-20)

MAP: Mean Arterial Pressure, HR: heart rate, RR: respiratory rate

Based on analysis, it was found that pain intensity difference at rest between those given and without intravenous dexamethasone was statistically significant with p value <0.001.

Table 3. Pain intensity at rest on 4, 12, 24 and 48 hours after cesarean section

Post surgery duration (hours)	Pain intensity at rest		P value ^a
	Intravenous dexamethasone	Control	
4	5 (5-8)	7,5 (7-9)	<0,001
12	4 (4-7)	6,5 (6-8)	<0,001
24	3 (3-6)	5,5 (5-7)	<0,001
48	2 (3-5)	4,5 (4-6)	<0,001
p value^b	<0,001	<0,001	

^a Uji Mann-Whitney, ^b Uji Friedman

Based on the analysis, it was found that pain intensity difference during activity between those given and without intravenous dexamethasone was statistically significant with p value <0.001.

Table 4. Pain intensity during activity on 4, 12, 24 and 48 hours after cesarean section

Post surgery duration (hours)	Pain intensity at rest		P value ^a
	Intravenous dexamethasone	Control	
4	6 (6-9)	8,5 (8-10)	<0,001
12	5 (5-8)	7,5 (7-9)	<0,001
24	4 (4-7)	6,5 (6-8)	<0,001
48	3 (3-6)	5,5 (5-7)	<0,001
P value^b	<0,001	<0,001	

^a Uji Mann-Whitney, ^b Uji Friedman

IV. DISCUSSIONS

In line with our study, Cardoso et al assessed pain scale in cesarean section patients that was given 10 mg dexamethasone compared to placebo (100 ml normal saline) and found pain at rest and pain on exertion which is lower in patients receiving dexamethasone at various time points during study period (P<0.001). Steroids analgesic effect occurs through peripheral enzyme phospholipase inhibition, which decreases cyclooxygenase products and lipoxygenase pathways in inflammatory response. These characteristics proved dexamethasone as suitable drug for pain treatment, both at rest and during activities.⁴ A randomized double-blind clinical study in 60 patients undergoing surgery with spinal anesthesia showed that postoperative pain severity significantly differed between two test groups where group A was given 8 mg IV dexamethasone before surgery compared to group B given 2 ml normal saline; where it was found that VAS was lower in group A than in group B with P < 0.001).²

Higher VAS scores were also detected among women in placebo group (administered 500 ml normal saline) than IV dexamethasone group (given 16 mg dexamethasone infusion) in Maged et al study. Postoperative morphine requirements at 1 hour to 24 hours after surgery were significantly higher in placebo group. There was a significant difference statistically between placebo and IV dexamethasone groups at 4, 12 and 24 hours after surgery based on postoperative morphine (additional analgesic) requirements.⁵ Given 8 mg dexamethasone IV immediately after umbilical cord clamping stage of cesarean delivery also had significantly lower pain scores at rest and during activity after 12 hours cesarean delivery.⁶

Shahraki et al conducted prospective, double-blind randomized clinical trial in 60 patients with elective cesarean section who received either 8 mg dexamethasone IV or 2 ml normal saline. There was a significant pain degree difference (P < 0.001) between two test groups, which is dexamethasone group having a lower VAS score than control group. Dexamethasone IV can efficiently reduce postoperative pain severity and need for additional analgesics, as well as improve vital signs after cesarean section. Wu et al evaluated and compared different dexamethasone and droperidol doses at cesarean section and concluded that patients receiving dexamethasone experienced less pain and vomiting. The results of this research are also in line with Jokela et al. and Hong et al. which shows that giving IV dexamethasone for pain after cesarean section surgery can reduce need for morphine the consumption of other analgesics.¹

Significant changes in VAS scores were also seen in post-cesarean patients after 1 hour to 24 hours of surgery (P < 0.001). After intracellular uptake, glucocorticoids activate cytoplasmic glucocorticoid receptors that bind to glucocorticoid response elements in DNA. This leads to a decrease inflammatory proteins production such as COX-2, iNOS, cytoplasmic PLA2, interleukin, inflammatory chemokines, etc., and an increase anti-inflammatory proteins production resulting decrease edema, scar tissue formation, and suppression of the immune response.⁷

Meanwhile, Kjetil et al's study which is giving 16 mg dexamethasone IV before mastectomy didn't showed significant results in pain reduction (VAS score) compared to placebo group.⁸ Mohtadi et al. study in 2014 concluded that giving single dose of IV dexamethasone reduced pain intensity and amount of meperidine consumption compared to placebo.³ Although single dose dexamethasone in this research did not clinically reduce pain scores, it was able to reduce need for additional analgesia by as much as 30% and has antiemetic properties. Therefore, procedure-specific postoperative pain management guidelines (PROSPECT) recommend use of single-dose IV dexamethasone in cesarean delivery without contraindications.⁹

V. CONCLUSION

There was a statistically significant differences VAS scores between dexamethasone and placebo group and VAS scores at rest and during activity was significantly reduced by given IV dexamethasone at 4, 12, 24 and 48 hours after cesarean section and significantly.

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