

# Evaluation of Dexamethasone for Postoperative Analgesia in Elderly Patients.

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## ABSTRACT

**Background:** Glucocorticoids are well known for their analgesic, anti-inflammatory, immune-modulating and antiemetic effects. The present study is done to see the effects of single dose IV administration of dexamethasone for postoperative analgesia in elderly patients on selective population of Bundelkhand region hospitalized for lower limb orthopaedic surgeries under spinal blockade. We found that duration of analgesia was dose dependent and patient receiving dexamethasone had better pain tolerability. **Methods:** Study was carried out on 120 patients of either sex, more than 60 year of age. The patients were randomly divided into four groups of 30 patients each. Group I (C): Patients were given 4 ml saline intravenously to serve as control group. Group II (D-8): Patients were given 8 mg dexamethasone diluted to 4ml iv. Group III (D-12): Patients were given 12 mg dexamethasone diluted to 4ml iv. Group IV (D-16): Patients were given 16 mg dexamethasone diluted to 4ml iv. Patients were observed for the following data: a. Onset of sensory block – tested by appearance of paresthesia, b. Time to reach peak of sensory & motor blockade, c. Recovery of sensory & motor function, d. Duration of anesthesia, e. Duration of complete analgesia- assessed by first demand for analgesic. **Results:** No significant difference among the study groups, which were slightly earlier than the control group while comparing time of onset of sensory/motor block. Duration of analgesia (time of onset of sensory block to first demand of analgesics) was maximum (545.03±45.25 min.) in group IV followed by group III (305.36±25.35 min.), which was found to be highly significant ( $p < 0.001$ ) in comparison to group I (155.06±12.27 min) Group IV > Group III > Group II > Group I. **Conclusion:** Onset of sensory and motor block was comparable in all the four groups. Duration of analgesia was dose dependent with 16 mg dose providing maximum duration of post-operative analgesia at rest in comparison to 12 mg and 8 mg dose.

**Keywords:** Dexamethasone, Postoperative analgesia

## INTRODUCTION

Relief of pain has always been the most wanted thing for the person suffering from pain. Pain relievers have fascinated human being since ancient times. Elderly patients undergoing surgery have special considerations that are to be taken care of. They are more likely to develop hemodynamic instability after anaesthesia; as they have diminished cardiac reserve and sympathetic tone. As such they develop profound hypotension after spinal anaesthesia. They have decreased ability to increase heart rate in response to hypovolemia, hypotension or hypoxia. Elderly patients have decreased adrenergic activity in response to surgical stress, besides having suppressed RAAS (rennin angiotensin aldosterone axis) system.

These features increase the propensity of this population group to develop perioperative hemodynamic instability. Glucocorticoids are well known for their analgesic, anti-inflammatory, immune modulating and anti-emetic effects.<sup>[1-3]</sup> Several randomized clinical trials in many different major and minor surgical procedures have been conducted to examine the effects of a perioperative single dose glucocorticoids administration.

The overall results on the postoperative outcome have either been positive in favours of glucocorticoids group or without differences between study group, with postoperative nausea and vomiting and pain as outcome parameters most significantly improved.<sup>[4,5]</sup>

It was therefore though worthwhile to study single dose IV administration of dexamethasone for postoperative analgesia in elderly patients. The present study was undertaken to assess role of IV dexamethasone given perioperatively; on hemodynamic stability and post op analgesia in elderly patients undergoing lower limb orthopedic surgery under spinal anaesthesia.

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## MATERIALS AND METHODS

The present study was conducted in the department of anesthesiology, MLB Medical college, Jhansi on geriatric patients admitted for elective lower limb orthopaedic surgeries. After obtaining ethical committee approval, a randomized placebo-controlled, dose finding study was carried out on 120 patients of either sex, more than 60 year of age. A well-informed & written consent was obtained from every patient. A detailed preanaesthetic checkup was done in all the patients. All patients were shown the verbal analogue scale and were appraised about the same during a preoperative visit one day prior to surgery in terms of pain, rather than percentage, as this is easily understandable even by lay and illiterate patients. The patients were then randomly divided into four groups of 30 patients each.

Group I(C): Patients were given 4 ml saline intravenously to serve as control group.

Group II (D-8): Patients were given 8 mg dexamethasone diluted to 4ml iv.

Group III (D-12): Patients were given 12 mg dexamethasone diluted to 4ml iv.

Group IV (D-16): Patients were given 16 mg dexamethasone diluted to 4ml iv.

These drugs are given just before spinal blockade. Pt. were observed for the following data

- Onset of sensory block – tested by appearance of paresthesia
- Time to reach peak of sensory & motor blockade
- Recovery of sensory & motor function
- Duration of anaesthesia
- Duration of complete analgesia- assessed by first demand for analgesic.

Monitoring was done for Perioperative pulse, blood pressure, SpO<sub>2</sub> & respiratory rate every 5 min for first 30 min and then every 10 min thereafter till the end of surgery, after which patients were observed ½ to 1 hourly till first analgesic demand. Strict

instructions were issued not to provide any analgesic to the patient postoperatively without consulting the anaesthesiologist. Patients were followed up post operatively.

- Post-operative pain: via verbal analogue scale assessed at the time of reversal of block
- Post-operative analgesia: by subtracting duration of anaesthesia from total duration of analgesia as and when patient complaint of pain, their score (VAS) were assessed and time was noted and taken as end point of duration of analgesia. Tramadol 50 mg iv was given as rescue analgesic.
- Adverse effect: such as nausea, vomiting, infection, delayed wound healing & perineal irritations were noted. All the observed data were tabulated & statistically analysed.

## RESULTS

- Time of onset of sensory block: No significant difference among the study groups, which were slightly earlier than the control group.
- Time of onset of motor block: No statistically significant difference between all the four groups.
- Duration of anaesthesia (from appearance of paresthesia upto return of vibration sense): no statistically significant difference between all the four groups.
- Duration of analgesia (time of onset of sensory block to first demand of analgesics): was maximum (545.03±45.25 min.) in group IV followed by group III (305.36±25.35 min.), which was found to be highly significant (p < 0.001) in comparison to group I (155.06±12.27 min) Group IV > Group III > Group II > Group I.
- Quality of analgesia (as assessed by verbal analgesia scale):
  - At the end of spinal blockade

**Table 1: quality of analgesia as assessed by VAS at the end of spinal blockade**

Analgesia score relevance	VAS	Group I (C)		Group II (D-8)		Group III (D-12)		Group IV (D-16)	
		No.	%	No.	%	No.	%	No.	%
1 No pain	0-10	0	0	2	6.66	22	73.3	24	80
2 Mild pain	11-40	6	20	16	53.33	5	16.66	6	20
3 Moderate pain	41-70	8	26.66	8	26.66	3	10	0	0
4 Severe pain	71-100	16	53.33	4	13.33	0	0	0	0
	mean±SD	65±23.66		39.6±11.67		13.33±6.38		9±3.26	

The above table shows the severity of post operative pain in all the four groups. Pain perception was highly blunted in group III (D-12) & IV (D-16),

moderately blunted in group II (D-8) at the end of block, as compared to group I (C).

- VAS score at the time of demand of first analgesic.

**Table 2: quality of analgesia as assessed by VAS at the time of demand of first analgesic**

Analgesia score relevance	VAS	Group I (C)		Group II (D-8)		Group III (D-12)		Group IV (D-16)	
		No.	%	No.	%	No.	%	No.	%
1 No pain	0-10	0	0	0	0	0	0	0	0

2 Mild pain	11-40	6	20	4	13.33	10	33.33	16	53.33
3 Moderate pain	41-70	8	26.66	18	60	17	56.66	12	40
4 Severe pain	71-100	16	53.33	8	26.66	3	10	2	6.66
	mean±D	65±13.66		59±12.25		48±10.63		41±10.11	

The above table shows the severity of post-operative pain at the time of demand of first analgesic. The intensity of pain was lower in group IV (D-16) & III (D-12) in comparison to group I (C).

## DISCUSSION

The severity of postoperative pain varies from individual to individual and is governed by following factors: age, sex, psychological factors, emotional factors, site & nature of surgery, pain threshold and anesthetic agents with technique.

Glucocorticoids are well known for their analgesic, anti-inflammatory, immune modulating and antiemetic effect. Several randomized clinical trails in many different major and minor surgical procedures have been conducted to examine the effect of a perioperative single dose glucocorticoid administration.<sup>[6]</sup>

The overall results on the postoperative outcome have either been positive in favour of glucocorticoid group or without difference between study group, with postoperative nausea and vomiting and pain as outcome parameters most significantly improved.

There is, however, a paucity of existing literature on the analgesic efficacy of dexamethasone in general and its dose in particular. However, large single dose, as high as 40 mg iv, have been recommended to produce effective postoperative analgesia.<sup>[7]</sup>

Encouraged from the above facts, it was thought worthwhile to study and evaluate, single dose I.V. dexamethasone for postoperative analgesia in elderly patients and assess its admissibility in day to day clinical practice.

The insignificant difference in the onset of sensory and motor block among the group can easily be explained on the basis of the fact that intravenous dexamethasone has no bearing on the onset and intensity of spinal blockade.

In the duration of anesthesia, there was no statistically significant difference among the study group (  $p > 0.05$ ). This concludes that administration of IV dexamethasone does not effect the course of spinal anaesthesia in any way.

Total duration of analgesia, observed from time of onset of sensory block to first demand of analgesic was maximum in group IV, followed by group III, group II & group I. Statistical comparison of the individual study groups with the control revealed that dexamethasone did produce a statistically significant increase in total duration of analgesia. (group II,  $p < 0.05$ ) group III & I V ( $p < 0.001$ ).

The duration of post-operative analgesia as was obtained by subtracting the time of spinal blockade from total duration of analgesia was found to be

maximum with 16 mg dose,  $p < 0.001$  followed by 12 mg dose,  $p < 0.001$  and 8 mg , $p < 0.01$ ; as compared to control group. The observed data showed that 12 mg and 16 mg dexamethasone produce a highly significant analgesia, varying between 5-7 & 7-9 hrs respectively.

In co-incident to the above findings, Kenneth J. Kardash and Frederic Sarrazin have reported 24 hrs suppression of dynamic pain following total hip arthroplasty with use of 40 mg i.v. dexamethasone and have attributed it to prolonged suppression of inflammatory response to surgery. In contrast, shorter duration of analgesia found in the present study can be explained by the use of smaller doses as compared to the above study.<sup>[6]</sup>

The degree of post-operative pain at the end of spinal blockade and at demand of first analgesic, as assessed by verbal analogue score [Table 2], the findings are consistent with Jaafarpour M , Khani A et al who concluded that in parturients undergoing caesarian delivery, performed under spinal anesthesia, prophylactic use of 8 mg dexamethasone was effective in reducing analgesic requirements and the patients had a significantly lower pain.<sup>[7]</sup>

No peri and postoperative side effects in terms of delayed wound healing<sup>[8,9]</sup> implant infection, nausea and vomiting , perineal irritation<sup>[10,11]</sup> were observed in the present study, till the patients were discharged from the hospital.

It can therefore be said that dexamethasone in dose of 16 & 12 mg, or may be higher is a valuable tool added to the armamentarium of the present day anaesthesiologist in combating postoperative pain in the elderly age group.

## CONCLUSION

On completion of the study and careful analysis of the observed data following conclusions were drawn.

- I. Onset of sensory and motor block were comparable in all the four groups.
- II. Duration of analgesia was dose dependent with 16 mg dose providing maximum duration of post-operative analgesia at rest in comparison to 12 mg and 8 mg dose.

Patient receiving dexamethasone had better pain tolerability and larger the dose, lesser was the postoperative analgesic requirement.

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