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ORIGINAL ARTICLE

A STUDY OF SINGLE DOSE DEXAMETHASONE IN REDUCING POSTOPERATIVE SORE THROAT, NAUSEA AND VOMITING IN PATIENTS RECEIVING GENERAL ANAESTHESIA FOR CAESAREAN SECTION

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ABSTRACT: OBJECTIVE: Postoperative sore throat and nausea and vomiting are common complaints in patients undergoing surgery, under general endotracheal anesthesia. Some of the studies have shown potential advantages of dexamethasone in prevention of postoperative sore throat. We therefore undertook a study to evaluate the efficacy of dexamethasone 8 mg administration intravenously, in reducing the incidence and severity of postoperative sore throat nausea and vomiting in patients undergoing caesarean section under general anesthesia with endotracheal intubation. **METHODS:** In a randomized, double blind and placebo controlled study, 60 patients receiving general anesthesia with endotracheal intubation undergoing caesarean section were randomly assigned to two groups. Group-I, patients received dexamethasone 8 mg IV and group-II received normal saline 2 ml IV. After surgery VAS score was used to assess sore throat and nausea, number of episodes of vomiting were recorded by a blinded observer. **RESULTS:** The overall incidence and severity of postoperative sore throat was less at all times in study group as compared to control group ($p<0.001$). 22 of 30 patients in dexamethasone group had sore throat as compared to 28 of 30 patients in control group ($p<0.05$). Even though there was no difference in the incidence of nausea in early postoperative period as compared to delayed postoperative period, there was significant reduction in severity of nausea in delayed and early postoperative period ($p<0.001$). There was no difference in incidence ($p>0.05$), but severity of vomiting was less in early postoperative period in dexamethasone group ($p<0.001$). There was significant reduction in incidence and severity of dexamethasone group in delayed postoperative period. **CONCLUSION:** Single dose dexamethasone reduces the incidence and severity of postoperative sore throat, nausea and vomiting in patients undergoing caesarean section under general endotracheal anesthesia.

KEYWORDS: Dexamethasone; Sore throat, Nausea, Vomiting, Endotracheal anesthesia, Caesarean section.

INTRODUCTION: Sore throat, nausea and vomiting after endotracheal intubation are an unpleasant and distressing experience to the patient. More common in female gender between ages 30-39.[1] Sore throat is 40% higher in females than males (44% versus 33%).[2] Sore throat although a minor complaint remains a source of postoperative morbidity.[3] The incidence of sore throat is up to 90%[4]. It depends on the degree of trauma during laryngoscopy, duration of tracheal intubation and types of tube.

PONV is still a common and major complication in surgical patients, which may delay the post anesthetic care unit discharge, prolong the stay and thus increase the cost of hospitalization. Prophylactic administration of antihistamines, antidopaminergics, anticholinergics, phenothiazines, serotonin antagonist, steroids and even acupuncture are shown to be effective. However, the

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expenses and even the side effects of these agents have also been concern to clinicians[5]. In a survey of ambulatory patients who were dissatisfied with the outcome of their operations, 71% cited PONV as the reason[6]. Corticosteroids are capable of reducing synthesis of inflammatory mediators, prostaglandins, leucotrines by inhibiting phospholipase and through production of Ca^{++} dependent phospholipid, binding proteins called annexins taking several hours and by inhibiting cyclo-oxygenase-2 during inflammation.[4]

Dexamethasone is known to decrease the incidence of vomiting. Single dose of dexamethasone is not known to interfere with wound healing or suppress pituitary adrenal axis.[4] Dexamethasone is potent steroid with analgesic, anti-inflammatory and antiemetic action.[4]

Therefore the study was undertaken to know the efficacy of single dose dexamethasone 8 mg IV in reducing common post-operative complications like sore throat, nausea and vomiting after general endotracheal anesthesia in patients undergoing caesarean section.

MATERIALS AND METHODS: The approval from the Ethical Clearance Committee was obtained from both Basaveshwar Teaching & General Hospital and Sangameshwar Teaching & General hospital, attached to M. R. Medical College, Gulbarga.

An informed and written consent also was obtained from all the patients.

The study comprised of 60 patients in the age group 15-45 years undergoing caesarean section under general endotracheal anesthesia. The patients were grouped in two groups of 30 each. Group-I patients received intravenous dexamethasone and group-II patients received normal saline:
Group-I: Study group – Dexamethasone group.
Group-II: Control group – Normal saline group.

Inclusion Criteria: All patients aged between 15-45 years belonging to ASA grade, I, II and III, undergoing caesarean section under general anesthesia with endotracheal intubation.

Exclusion Criteria:

1. All patients with renal impairment.
2. All patients with endocrinal abnormalities.
3. All patients with history of motion sickness.
4. All patients with history of Ryle's tube and vomiting for 24 hours.
5. All patients on steroidal therapy.

Preoperative preparation and Assessment: All patients were assessed preoperatively in labour room or preoperative preparation room. All patients received injection metoclopramide 10 mg IV slowly over a period of 10-15 minutes and injection Ranitidine 50 mg IV slowly over 10-15 minutes. The protocol for study and use of visual analogue scale was explained to all the patients.

Anesthetic Technique: In the operative room, all patients were started on 2-litres of oxygen by nasal prongs and a left lateral tilt of 15º was given to all the patients. A large bore, 18G IV access was started. They were all connected to pulse oximetry and blood pressure monitoring devices.

Group-I patients received 8 mg of dexamethasone intravenously. Group-II patients received 2cc of normal saline intravenously. Pre-oxygenation was done with 100% oxygen.

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All patients were induced with injection propofol 1.5-2 mg/Kg, or thiopentone 3-5 mg/kg, or ketamine 1-2 mg/kg body weight IV or a co-induction was done with combination of drugs depending on the ASA status and cardiopulmonary status.

Rapid sequence intubation was done with injection succinyl choline 75 mg IV with cuffed portex endotracheal tubes (7 and 7.5). Cricoid pressure was applied with induction of anesthesia till the tube was passed beyond vocal cords and cuff was inflated.

Laryngoscopy was performed with 3 or 4 Macintosh blades. Cuff was inflated with air till there was no air leak, then slowly deflated till a small leak was heard on auscultation.

Anesthesia was maintained with nitrous oxide and oxygen (3:3) and halothane 0.5% plus injection atracurium 0.3-0.5 mg/Kg till extraction of baby, once baby was extracted injection midazolam 0.05 mg/kg body weight and injection pentazocine 0.5 mg/Kg body weight were given.

All patients were reversed with injection neostigmine 0.04-0.06 mg/kg body weight and glycopyrrolate 0.2 mg/ 1 mg of neostigmine. Awake extubation was done after thorough oral suctioning.

Analgesia was achieved with tramadol 1-2 mg/Kg in drip and injection diclofenac sodium 75 mg IM before shifting the patients to recovery room.

MONITORING: In the intraoperative period all patients were monitored for heart rate, blood pressure and SpO_2 at regular intervals. Sore throat was assessed on the visual analogue scale (Linear 10 cm starting from 0- no pain to 1- worst pain) at rest and on efforts. Nausea was also assessed on visual analogue scale (linear 10 cm – starting from 0 – no nausea to 10 severe nausea) at regular intervals. Incidence of vomiting in the postoperative period were recorded. A note was made on the rescue emetics given.

Statistical analysis was done by applying statistical parametric tests like 't' test, chi-square test and correlation test.

OBSERVATIONS AND RESULTS:

The following observations were made:

Age group (Years)	Study group		Control group		Total	
	No.	Percent	No.	Percent	No.	Percent
15-24	13	43.33	13	43.33	26	43.33
25-34	14	46.67	15	50.00	29	48.33
35-44	03	10.00	02	6.67	05	8.34
Total	**30**	**100.00**	**30**	**100.00**	**60**	**100.00**

Table 1: Age wise distribution of study group and control group

Mean age of control group 24.32±4.1.

Mean age of study group 25.73±5.2.

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Figure 1: Age wise distribution of study group and control group.

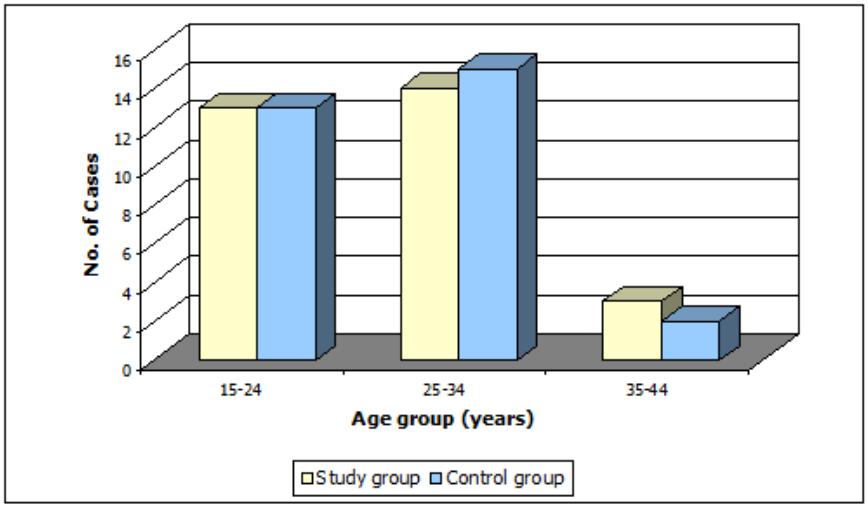

Fig. 1

Age is not significantly different among study group and control group.

Group	Time duration in min (mean±SD)	t-test	p-value & significance
Study group	70.33±28.90	1.36	0.05 (not significant)
Control group	62.55±9.28		

Table 2: Comparison of duration of surgery among study group and control group

In patients of group-I, the mean duration of surgery was 70.33±29.8 minutes and in group-II, it was 62.55±9.28. The p-value >0.05, which showed that there was no significant difference in the duration of surgery between two groups. There is no significant difference of duration of surgery among study group and control group.

Figure 2: Comparison of duration of surgery among study group and control group.

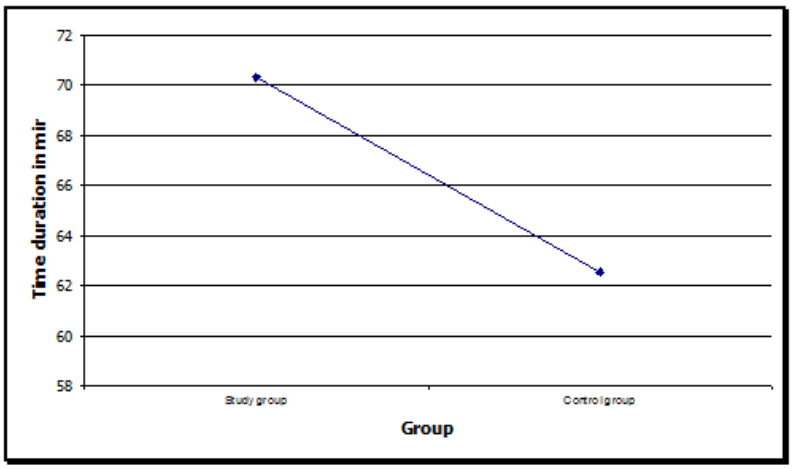

Fig. 2

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Time in hrs	Sore throat (mean±SD)		t-test	p-value & significance
	Study group	Control group		
1 hr	1.01±1.25	2.50±2.00	3.47	<0.001 VHS
2 hrs	1.53±1.54	2.87±1.85	3.12	<0.01 HS
6 hrs	1.23±1.38	2.73±1.93	3.49	<0.001 VHS
12 hrs	0.53±1.02	2.30±2.19	4.03	<0.001 VHS
24 hrs	0.23±0.71	2.00±2.17	4.32	<0.001 VHS

Table-3: Comparison of VAS score in control and study groups at various time intervals for postoperative sore throat at rest

Postoperative sore throat was lower in group-I compared to group-II. The p-value was very highly significant (p<0.001) at all-time intervals except at 2nd hour, where (<0.01), which is also highly significant.

Figure 3: Comparison of VAS score in control and study groups at various time intervals for postoperative sore throat at rest.

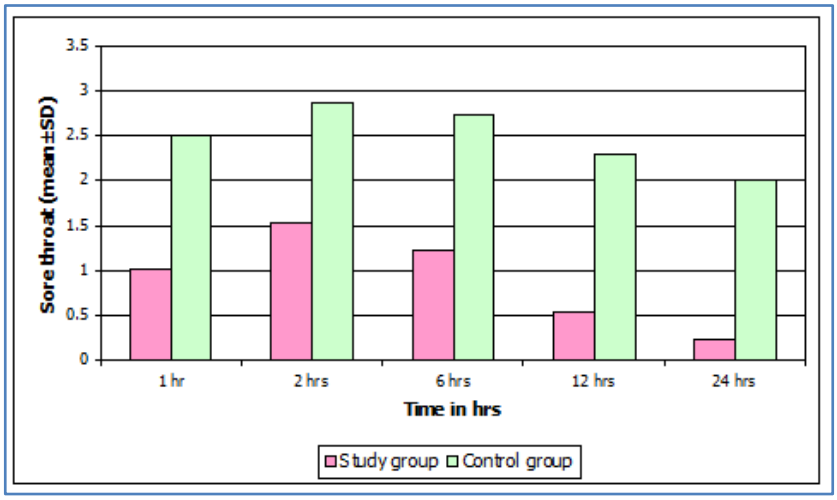

Fig. 3

Time	No. of cases	Sore throat in hrs (mean±SD)		t-test	p-value & significance
		Study group	Control group		
1 hr	30	1.50±1.62	3.23±2.43	3.26	<0.01 HS
2 hrs	30	2.20±2.02	3.93±2.60	2.98	<0.01 HS
6 hrs	30	1.76±1.94	3.53±2.31	3.28	<0.01 HS
12 hrs	30	0.70±1.36	2.90±2.58	4.16	<0.001 VHS
24 hrs	30	0.32±1.01	2.46±2.44	4.46	<0.001 VHS

Table 4: Comparison of VAS score in control and study groups at various time intervals for postoperative sore throat at effort

HS – Highly significant

VHS – Very highly significant

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Sore throat at effort was very highly significant on VAS (p<0.001) at 12th and 24th hours postoperatively. Incidence of sore throat was highly significant (HS) at 1st, 2nd and 6th hours. Sore throat on effort was severe in only 4 cases in group-I, as compared to 10 patients in group-II.

Figure 4: Comparison of VAS score in control and study groups at various time intervals for postoperative sore throat at effort.

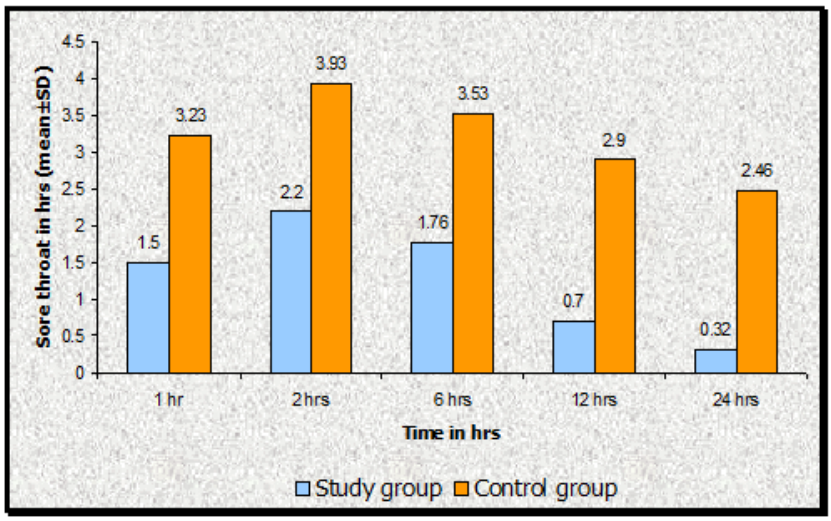

Fig. 4

Time in hrs	Nausea scores (mean±SD)		t-test	p-value & significance
	Study group	Control group		
1 hr	0.86±1.30	0.93±1.23	0.29	>0.05 NS
2 hrs	1.60±2.44	1.15±1.76	0.97	>0.05 NS
6 hrs	0.76±1.30	3.00±2.79	4.12	<0.001 VHS
12 hrs	0.30±0.93	2.66±2.82	5.24	<0.001 VHS
24 hrs	0.360±0.93	2.01±1.90	4.50	<0.001 VHS

Table 5: Comparison of study group and control group for postoperative nausea score

NS – Not significant
HS – Highly significant
VSH – Very highly significant

The incidence of postoperative nausea was more in group-II compared to group-I. The incidence was similar in 1st and 2nd, but significantly higher in 6th, 12th and 24 hours in group-II patients. Number of patients who had nausea at 6th, 12th and 24th hour in group-I were 8, 3, 3 respective as compared to group-II were 19, 18, 13 respectively. Nausea was more in group-II as compared to group-I at 6th, 12th and 24th hour. It was statistically very highly significant p<0.001.

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Figure 5: Comparison of study group and control group for postoperative nausea score.

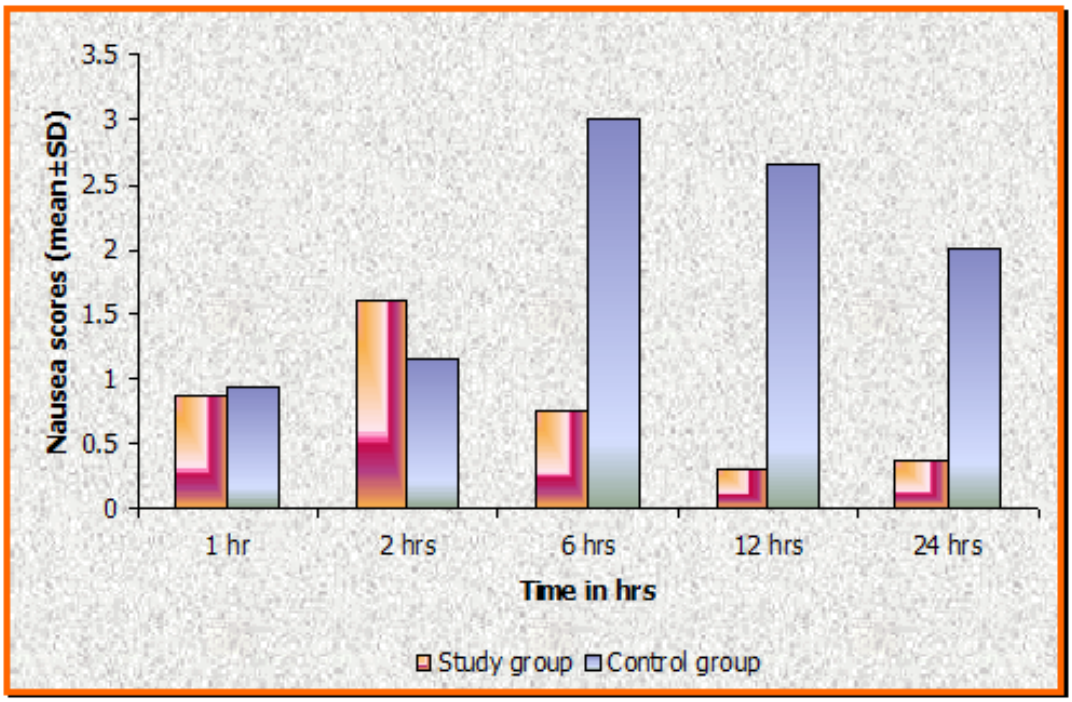

Fig. 5

Time in hrs	Incidence of vomiting in hours (mean±SD)		t-test	p-value & significance
	Study group	Control group		
1 hr	0.06±0.25	0.29±0.79	1.55	>0.05 NS
2 hrs	0.10±0.30	6.30±0.73	1.43	>0.05 NS
6 hrs	0.03±0.17	0.70±1.20	3.05	<0.01 HS
12 hrs	0.03±0.17	0.61±0.95	3.41	<0.001 VHS
24 hrs	0.03±0.17	0.56±0.82	3.78	<0.001 VHS

Table 6: Comparison of study group and control group for incidence of vomiting in hours

NS – Not significant
HS – Highly significant
VSH – Very highly significant

Incidence of postoperative vomiting was about 12 patients in group-II as compared to 5 patients in group-I. There was no much difference in the vomiting in the early postoperative period (<2 hr) in the two groups p>0.05.

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Figure 6: Comparison of study group and control group for incidence of vomiting in hours.

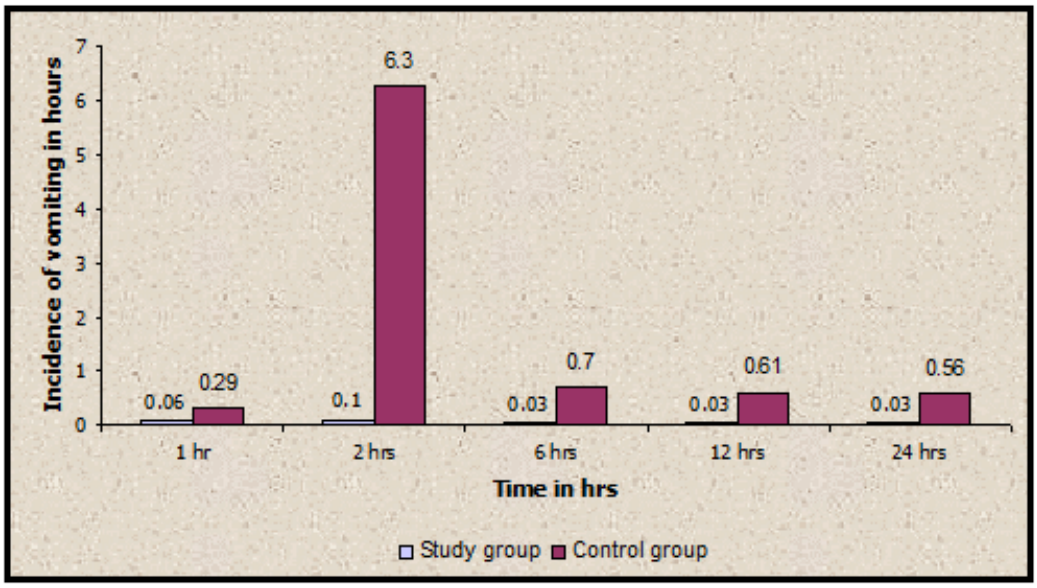

Fig. 6

Overall incidence of emesis was more in group-II (2) as compared to group-I (5), which was statistically significant ($p<0.05$). The p-value was not significant at 1 hour and 2nd hour ($p>0.05$). It was highly significant ($p<0.01$) at 12th and 24th hours. There is no much difference in the incidence of vomiting in early hours statistically. The incidence of vomiting was significantly less in the delayed (>4 hours) postoperative period in group-I patients as compared to group-II.

Even the severity of vomiting in group-I patients was less as compared to group-II. The incidence of severe vomiting in 1st hours was more in group-II (3 patients) as compared to group-I (1 patient).

In late postoperative period also severe vomiting were seen in 10 patients in group-II as compared to 1 patient in group-I.

There was significant difference in the incidence and severity of vomiting in the delayed postoperative period in dexamethasone group as compared to control group ($p<0.001$).

Type	Early				Late			
	Gr-I		Gr-II		Gr-I		Gr-II	
	No.	%	No.	%	No.	%	No.	%
Nil	25	83.33	25	83.33	29	96.67	18	60.0
Mild	3	10.00	1	10.00	--	--	1	3.33
Moderate	1	3.33	1	3.33	---	--	1	3.33
Severe	1	3.33	3	3.33	1	0.33	10	33.33

Table 7: Severity of emesis in study group and control group

$\chi^2=0$ $p<0.05$ ns $\chi^2=11.8$ $p<0.001$ VHS

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Figure 7: Severity of emesis in early postoperative period.

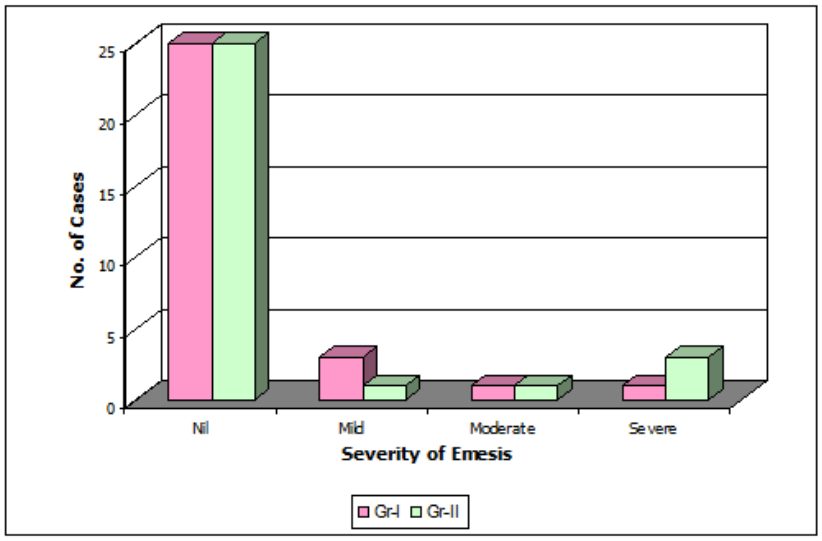

Fig. 7

Figure 8: Severity of emesis in delayed postoperative period.

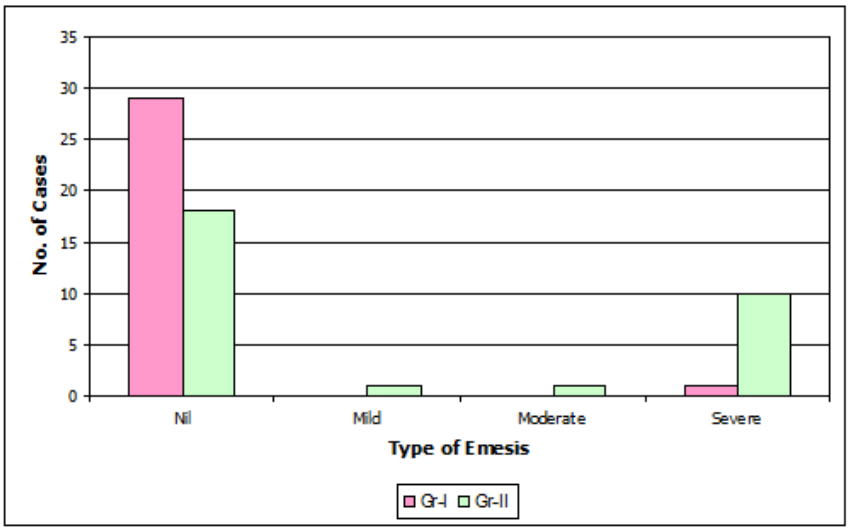

Fig. 8

Groups	No. of cases without emesis	No. of cases with emesis	Total cases
Study group	25	05	30
Control group	18	12	30
Total	**43**	**17**	**60**

Table 8: Comparison of emesis in study group and control group

χ^2=4.42; p<0.05 Significant

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	Group-I		Group-II	
Early	5	6.67	5	6.67
Late	1	3.33	12	40.00
Total	**6**	**20.00**	**17**	**56.67**

Table 9: Incidence of vomiting in study group and control group

Injection ondensetron 4 mg IV was the rescue antiemetic given in postoperative period. Five patients in group-I needed rescue emetics as compared to 12 patients in group-II. Two cases in group-II, received ondensetron 4 mg for 2nd time at 24 hours.

COMPLICATIONS: The incidence of any adverse events were recorded like headache, dizziness, dysphagia, and dyspnea. There were no such events recorded.

DISCUSSION: Sore throat is mainly because of trauma to pharyngolaryngeal mucosa from laryngoscopy, placement of nasogastric tube, oral sectioning, cuff designing, pressure affecting tracheal mucosal capillary perfusion and contact of tracheal tube with vocal cord and posterior pharyngeal wall resulting in oedema and mucosal lesion.[4]

In this study we used a low pressure high volume cuff & the cuff was inflated till small leak occurred on auscultation. Cuff pressure was checked repeatedly. Duration of intubation was restricted to not more than 30secs, minimal suctioning was done intraoperatively.

Siji Thomas and collegues[4] showed that dexamethasone 8mg iv reduced the incidence and severity of sore throat in intubated patients. Kazemi A and colleagues[7] used betamethasone gel, Gulhas N and colleagues[8] administered dexapanthenol pastille prophylactically to reduce the incidence of sore throat in intubated patients.

In this study the incidence of sore throat at rest was lower in dexamethasone group compared to control group, (73.33% vs 93.33%). Statistically the incidence and severity of sore throat was very highly significant at all-time intervals ($p<0.001$). Postoperative sore throat at effort was also less in dexamethasone group at all-time intervals ($p<0.001$).The severity of sore throat decreased with time interval in dexamethasone group. There was no severe sore throat recorded at 12th and 24th hr in study group

Corticosteroids are capable of reducing synthesis of inflammatory mediators, prostaglandins, leucotriens by inhibiting phospholipase and through production of Ca^{++} dependent phospholipids binding proteins called annexins taking several hours by inhibiting cyclooxygenase-2 during inflammation. Dexamethasone is potent steroid with analgesic anti-inflammatory and antiemetic action.[4] Single dose of Dexamethasone is not known to inference with wound healing or suppress pituitary adrenal axis.[4] Therefore Dexamethasone reduced the incidence and severity of sore throat in intubated patients.[4]

Patients undergoing caesarean section are associated with increased incidence of PONV (30-60%).[9] Many factors have been thought to contribute to the PONV, the non-anesthetic factors may be, patient related factors, like age, gender, body mass, gastroparesis, anxiety, previous PONV, history of motion sickness or type and duration of surgical procedures. Anesthesia related factors like use of opiods gastric distension, repeated suctioning, nitrous oxide and inhalation agents. In post-operative

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period, pain dizziness and ambulation can cause vomiting. In this study the incidence of nausea was more in control group as compared to dexamethasone group. The incidence was similar in both groups in 1st 2hrs ($p>0.05$) and significantly less in dexamethasone group at 6th 12th & 24th hr ($p<0.001$).

Nausea score in group 1 & 2 did not show any (>0.05) difference in 1st 2hrs but nausea score was significantly ($p<0.001$) low at 6th 12th and 24th hr in dexamethasone group.

The efficiency of steroids as antiemetic was first established in chemotherapy including vomiting. Many studies were conducted by Rich WL,[10] Apro & Alberts D[11] and Cunningham D et al[12] to show the efficiency of Dexamethasone in preventing PONV. A dose response study by Drapkin & Soki[13] evaluated the efficiency of dexamethasone in control of delayed nausea.

Study by Elhakim[14] and colleagues showed decrease in incidence of early and delayed vomiting ($p<0.05$, $p<0.001$) respectively.

Biswas BM,[15] Wang JJ[16] & colleagues, Nesek Adam[17] and many studies showed better control of PONV with combination of metoclopramide. In this study the incidence of vomiting were more in control group and few in dexamethasone group.

There was no much difference in incidence, in both group during early post-operative period ($p>0.05$), but there was significant difference in late post-operative period ($p<0.001$). The severity of vomiting was lower in dexamethasone group. Only 1 patient had severe vomiting as compared to 3 in control group during the 1st 2hrs. In the delayed post-operative period also the patients with severe vomiting were 33.33% & 3.33% in control group & dexamethasone group respectively.

Dexamethasone reduces the severity & incidence of vomiting in early, as well as delayed post-operative period. Siji & Thomas study also showed association of decreased PONV in dexamethasone group[4]. There were no untoward effect of drug in postoperative period. This study shows that dexamethasone significantly reduced the common post-operative complications like PONV and sore throat in patients undergoing caesarean section under general endotracheal anaesthesia.

CONCLUSION: This study concluded that dexamethasone 8 mg administered intravenously before the induction of anesthesia, effectively reduced the incidence and severity of sore throat in the postoperative period.

There was decreased incidence and severity of sore throat in both groups ($p<0.001$) at all-time intervals.

There was decreased incidence and severity of nausea in dexamethasone group ($p<0.001$).
In early postoperative period, the incidence of nausea and vomiting were similar in both groups ($p>0.05$), but severity of nausea and vomiting was less in dexamethasone group ($p<0.001$).

In the late postoperative period dexamethasone significantly reduced both incidence and severity of nausea and vomiting ($p<0.001$) and also the need for rescue emetics. There was no untoward effects of drug reported in the postoperative period.

Therefore, preoperative administration of dexamethasone reduced the incidence and severity of sore throat, nausea and vomiting in patients undergoing caesarean section under general anesthesia.

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