

## Comparison The Effect Of Dexamethasone On The Blood Glucose Level Between Pregnant Versus Non Pregnant Females Under General Anesthesia

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### Abstract:

**Background:** Dexamethasone prevent postoperative nausea and vomiting. In spite of this advantage, it found that injection of intravenous (IV) dexamethasone direct affect the blood glucose. We compared blood glucose concentrations after intravenous injection of dexamethasone in the pregnant and non-pregnant women under general anesthesia.

**Aim of study:** to compare the effect of dexamethasone on the blood sugar levels and about its safety especially in the pregnant women.

**Patient and method:** Eighty patients aged 18-50 years. ASA class 1 and 2. Forty of patients undergoing elective cesarean section under G/A and the other forty undergoing elective laparoscopic Cholecystectomy under G/A. anesthesia was induced by using IV anesthetic drugs (0.5mg/kg ketamine, sleeping dose of propofol up to 2mg/kg, muscle relaxant was 0.6 mg/kg rocuronium and maintained with isoflurane). All of patients have injected with 0.1mg/kg dexamethasone intravenously, at induction of anesthesia, Blood glucose concentrations measured at induction and then at 60min, 180min and at 360 min after injection of dexamethasone and compared between the groups, IV fluid was normal saline (0.9%) during the study.

**Result:** Regarding to blood glucose levels, we noticed that significantly increase over time and peaked at 180min after dexamethasone injection in both group. The difference percentage between the lower reading (pre injection) and the upper reading (at 180min) was 33.5% for pregnant woman and 46.2% for non-pregnant women, this difference was statistically significant relative to the pre injection, as we see this difference was lower in the pregnant women. At 360min, blood sugar readings start to drop in both groups. **Conclusion:** After giving 0.1 mg/kg of dexamethasone, blood glucose increased in both groups but it was lower in the pregnant women.

**Keywords:** blood glucose, pregnant, non-pregnant, intravenous dexamethasone, laparoscopic cholecystectomy, caesarean section.

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### **Introduction:**

Dexamethasone is a kind of corticosteroid pill. It is used in the management of numerous disorders, like; "rheumatic problems, croup, brain swelling, with antibiotics in tuberculosis". In preterm labor, it is used to recover consequences in the baby <sup>1</sup>. It is the most actual and harmless medicine required in a health scheme <sup>2</sup>. Dexamethasone is not costly <sup>3</sup>. It is group C in pregnancy sense use should be based on benefits being expected to be better than dangers <sup>2</sup>. In Australia, it is considered class A; it is regularly used in gestation and not found to lead to harms to the baby <sup>4</sup>. It is approved when the patient is not really healthy to "prednisone or methylprednisolone" <sup>5</sup>. **Aim of study:** to compare the effect of dexamethasone on the blood sugar levels and about its safety especially in the pregnant women.

### **Method:**

This study is a longitudinal observation comparative study conducted at Al Yarmuk teaching hospital, digestive system hospital, and Baghdad teaching hospital, Baghdad, Iraq. Which started in the first of May 2018 until the thirtieth of December 2018. Eighty patients assigned; forty of them with elective cesarean section, the rest with elective laparoscopic cholecystectomy. The patients were included in the study according to the following criteria:

- Age 18-50 years.
- Patients of ASA class 1 & 2.
- Patients were scheduled for elective C/S and elective Lap. Chole

Exclusion criteria:

1. Patient refusal.
2. Patient with contraindication or allergy to dexamethasone.
3. Diabetic patient.
4. Hypertensive patient.
5. Alcoholic patient.
6. Hypoglycemic patient.
7. Patient already on dexamethasone or another type of steroid drug.

## 8. Twin pregnancy.

The study was approved by the Iraqi scientific council of anesthesia and intensive care and the consent was obtained from all patients before include them in study. A detailed history was taken from each patient; clinical examination was performed pre-operatively. All the patients prepared properly to the operation, patient have fasting for about 8 hours, wide bore IV cannula inserted, lying in supine or left lateral decubitus position in the case of C/S. Connecting to the monitoring (pulse rate, noninvasive blood pressure, SPO2 saturation, ECG. All patient received 50 mg ranitidine, 10 mg metoclopramide and 0.02 mg/kg midazolam as IV pre induction. Anesthesia was induced with 0.5 mg/kg ketamine, sleeping dose of propofol up to 2mg/kg, 1mg /kg tramadol and tracheal intubation (with size 7.0-7.5 ID endotracheal tube) was facilitated with muscle relaxant (rocuronium 0.6mg/kg). Eight mg dexamethasone was given to all patients. Anesthesia was maintained with isoflurane 1.5% in 100% oxygen neuromuscular blockade was maintained with muscle relaxants (rocuronium). Analgesia was maintained by intravenous paracetamol bottle 15 mg/kg and nefopamHcl 20 mg, fentanyl 1 Mg/kg. (After delivery of baby in the cases of C/S).

Patients were selected to be in two groups A&B:

- ❖ Group (A): patients with elective C/S.
- ❖ Group (B): patients with elective Lap. Chole

Patients in our study were monitored until 360 min. Finger prick capillary blood glucose was measured immediately before dexamethasone administration (T0), 60min (T1), 180 min (T2) and at 360 min (T3). All the patients received normal saline, if glucometer reading was less than 70 mg/dl should have glucose water. Were if one of the patients have blood sugar reading more than 200 mg/dl should be treated with insulin, this two condition if occur should be consider dropped cases. **Statistical analysis** done by SPSS 22, frequency and percentage used for categorical data, mean and SD for continuous data. Students-t-test used for assessed difference mean between variables, Chi-square used for assessed association between variables, P-value less or equal to 0.05 is consider significant.

## Results:

The total number of study patients was 80, 40 of them undergoing elective C/S under general anesthesia (group A) the other 40 undergo elective Lap. Chole. Under general anesthesia, (group B). The distribution of study by the age and weight (BMI) as show in the tables (1, 2). Study patients age was

ranging from (18-32). We noticed that there was no statistical significant difference in the mean of age with (p. value = 0.052)

**Table (1): distribution of study patient by age**

		A		B		P value
		No	%	No	%	
Age (years)	<20	6	15.0	-	-	0.052
	20---29	16	40.0	6	15.0	
	30---39	12	30.0	22	55.0	
	40---49	6	15.0	12	30.0	
	Mean ± SD (Range)	28.6±7.3 (18-41)		36.8±6.1 (23-44)		

**\*Significant difference between proportions using Pearson Chi-square test at 0.05 level.**

Regarding weight (BMI) was ranging from (18.5-32). We noticed that there was no statistical significant difference in mean of weight with (p. value=0.0675)

**Table (2): distribution of study patients by BMI.**

		A		B		P
		No	%	No	%	value
BMI (Kg/m2)	Normal (18.5-24.9)	16	40.0	12	30.0	0.675
	Overweight (25-29.9)	18	45.0	18	25.0	
	Obese (>=30)	6	15.0	10	45.0	
	Mean±SD (Range)	29.7±8.0 (19-42)		30.0±6.8 (20-41)		

**\*Significant difference between proportions using Pearson Chi-square test at 0.05 level**

**Table (3): comparison of blood sugar levels at baseline, 60min, 180min, and 360min post operatively.**

Random blood sugar (mg/dl)	A	B	difference	P value
<b>T0</b>	90.1±14.4	95.3±8.5	5.2	0.105
<b>T1</b>	102.3±9.5	110.6±7.9	8.3	0.035*
<b>T2</b>	123.9±21.6	141.2±14.9	17.3	0.001***
<b>T3</b>	115.7±8.4	130.7±11.9	15.7	0.0028**
*Significant difference between two independent means using Students-t-test at 0.05 level.				
*T0=Base line reading, T1=60min, T2=180min, T3=360min.				

There was no statistically significant difference between blood sugar levels at T0 between two groups with P value 0.105.

There was a statistically significant increase in the blood sugar levels at T1 and at T2 in both group were them higher at T2, (this difference is statistically higher in the non-pregnant than the pregnant group)in addition there was statically significant decrease in the blood sugar reading at T3.

**Table (4): comparison between consecutive blood sugar readings (mean difference) in the both group**

Variable	T1-T0	T2-T0	T3-T0	T3-T2
<b>A</b>	12.2	33.8	25.6	-8.2
<b>B</b>	15.3	45.9	35.4	-10.5
*Significant difference between two independent means using Students-t-test at 0.05 level.				

There was statically significant increase in the blood sugar reading from the base line and most significant increase at 180 min(T2), at 320 min(T3) blood sugar reading start to decrease.

**Table (5): comparison in the difference percentage at baseline-180min between two groups.**

Variable	T2-T0	P value
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A	30.5 ±12.7%	<0.001*
B	48.2±19.2	

\*Significant difference between two independent means using Students-t-test at 0.05 level.

### Discussion:

Evaluation the blood glucose outline of 80 non-diabetic woman experiencing optional cesarean section and elective laparoscopic cholecystectomy. The main finding of this study is that (360 min) period, after intravenous injection of 0.1mg/kg of dexamethasone given at induction of anesthesia, Blood glucose concentration was increased over time in both groups but this increase was peaked at 180 min more than 60 min, at 360 min of dexamethasone injection blood sugar readings start to decrease (There was no statistically significant difference in the blood glucose levels pre intravenous injection of dexamethasone between the two groups). However, several studies have reports, routine use of dexamethasone for postoperative nausea and vomiting have documented an increase in blood glucose levels in the postoperative period. Bin wang et al<sup>6</sup>. Hans et al<sup>7</sup> examined sequential blood glucose levels afterward-intravenous dexamethasone direction in diabetic and non-diabetic patients, high blood glucose after 120 min. after giving, and the extreme concentration of blood glucose advanced in diabetic patients. Tien M, et al<sup>8</sup>. Finds that the patients who treated with dexamethasone demonstrated significant increase in the blood glucose level over the course of surgery as well as the postoperative period compared to those who did not received the steroid therapy. The former three study have agree with our study in the effect of dexamethasone on the blood sugar but the second study have disagree with us in the time of peak blood sugar. Murphy et al<sup>9</sup> show where two doses of dexamethasone were directed in two dissimilar groups “early and late group” and likened with control group they decided that the highest blood glucose was like in the dexamethasone group with a highest happening within 2 - 3 hours and remained raised to 8 hours, as compared to our Study, there is difference in the time of starting decrement in the blood sugar levels. These increases in the blood sugar might be due to the effect of dexamethasone on impairing insulin sensitivity. Lunkins et al<sup>10</sup> included 34 patients without diabetes undergoing craniotomy in their study. Of these, one group of patients received placebos only, one group received 10 mg of intravenous dexamethasone, and one group of patients received 4 mg of intravenous dexamethasone, 6 hours after surgery all of the patients showed main high in blood glucose level overhead the baseline values when compared with the other group we notice that, Although this change in the blood glucose is significant 180 mg /dl at all times in the both group. The study show post-

operative elevation in the blood glucose is lower in the pregnant than non-pregnant female; this may be due to the increase level of insulin in the pregnancy for collecting glucose to the growing baby. There was no study have administer the effect of single dose of dexamethasone on the blood sugar levels in pregnant women pre anesthetic induction but there was many of studies that administer the effect of dexamethasone as multiple doses used mostly in the preterm labor.

### **Conclusion:**

Intravenous administration of dexamethasone to prevent PONV high the blood glucose level in pregnant and non-pregnant female but it is lower when compared to non-pregnant one, but this increment was not so high that need intervention, subsequently none of the patient required management for hyperglycemia.

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