IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 14, Issue 9 Ver. II (Sep. 2015), PP 60-62
www.iosrjournals.org

Incidence of hypoglycemic response based on preoperative fasting duration in children

Vishnu Das[1], S Padmanabha[2]
[1](Department of anaesthesiology, Yenepoya university, India)
[2](Department of anaesthesiology, Yenepoya university, India)

Abstract:
Aim: *To find out incidence of hypoglycemic response based on preoperative fasting duration in children.*
Method: *70 patients of ASA-1and 2, in the age group of 2-6 years were randomly divided into 2 groups (35 patients each). Group I patients were kept nil per oral from midnight and Group II patients were given clear fluid 2 hours prior to the surgery. Consent to participate in the study was taken from one of the parents. Standard anaesthesia technique was followed for all the patients. The first and second blood glucose estimation was performed prior to induction of anaesthesia and 20 minutes after induction respectively. And this was correlated with the duration of preoperative fasting.*
Result: *Out of the 35 patients of group I, 25 patients had blood glucose level of <50mg/dl just before induction and in group II all the patient had blood glucose level >80mg/dl just before induction. The blood glucose level of all the 70 patients, 20 minutes after induction was >100mg/dl.*
Conclusion: *In this study it was concluded that the patients with prolonged duration of fasting had hypoglycaemia while patients who had fluid intake 2hrs prior to surgery did not develop hypoglycaemia.*
Keywords: *children, blood glucose, preoperative, fasting, hypoglycaemia*

I. Introduction

Preoperative fasting is defined as a prescribed period of time before a procedure when patients are not allowed the oral intake of liquids or solids [1]. Hypoglycemia is defined as being a perioperative danger in paediatric practice predisposing to lethargy, irritability and metabolic acidosis with resultant anaesthetic problems including seizures. Normally there is a rise in the plasma glucose level in normal adult, but it has been shown that children do not respond with a hyperglycemic reaction to the same degree. The mean normal fasting glucose concentration is in a range of 28-96 mg/dl [2]. The concentration increases to mean of 77mg/dl at 2 years and 92 mg/dl at 15 years. Allison et al considered 3.3 mmol/l (60mg/dl) to be lower limit of normoglycemia[3].

Hypoglycemia is provoked by fasting though it is not inevitable consequence of withholding food. The body conserves glucose by a decrease in concentration of circulating insulin and an increase in the concentration of counter regulatory hormones – growth hormones, glucogon, cortisol and adrenaline. Whether preoperative fasting causes hypoglycaemia in healthy infants and children is still not resolved. The purpose of the study was to measure the effect of preoperative fasting on blood glucose levels in children undergoing elective surgical procedure.

II. Method

Seventy patients with ASA I and II and between the age group of 2years to 6years who were scheduled for surgical procedures like tonsillectomy, adenotonsillectomy, laparotomy, appendicectomy and circumcision were enrolled for this study. Patients with any cardiac illness, pulmonary illness, metabolic diseases were excluded from the study. Also patients who are still breast feeding were excluded from the study. Written and informed consent from either of the parents was obtained and institutional ethical committe approval for this study was obtained. These 70 children were randomly categorized into two groups. Group I had 35 patients and the parents were instructed not to give any feeds after midnight to the patients while in group II which also had 35 patients, orally 50ml of water was given 2 hours prior to the surgery. No premedication was advised on arrival to the operating room. Topical 2% Emla cream was applied 1hour before the induction time on the possible puncture sight for intravenous access. After establishing intravenous line 2ml of blood collected from the patient and send for glucose level estimation immediately. Intravenous fluid 0.45% saline with dextrose started along with monitoring electrocardiography, heart rate non invasive blood pressure and saturation of oxygen. Then baseline values of these were recorded.

Standard anaesthesia technique was followed in all the patients. At the induction of anaesthesia injection Fentanyl 1.5mcg/kg body weight was given intravenously. Induction of anaesthesia was done with propofol 1-2mg/kg body weight followed by atracurium 0.5mg/kg body weight to facilitate endotracheal intubation. Anaesthesia was maintained with 60% nitrous oxide in oxygen supplemented with sevoflurane as inhalational

agent. Muscular relaxation was maintained with additional atracurium doses as required. Second sample of 2ml blood was taken after 20minutes and send for glucose level estimation. Anaesthesia was maintained till the end of the surgery and the neuromuscular block was reversed with atropine 0.02mg/kg and neostigmine 0.07mg/kg injected intravenously and patient was extubated in the lateral position.

For the purpose of this study, hypoglycemia was defined as a blood glucose concentration of less than 50 mg/dl [4]

III. Results

The mean blood glucose levels (mg/dl) in group I and group II were 54 ± 11.22 and 96.1 ±4.97 respectively before the induction of anaesthesia. The differences in the mean blood glucose levels before the induction of anaesthesia in both the groups were statistically significant with a p-value of 0.001. (Table I).

The comparison of blood glucose levels prior to induction of anaesthesia to blood glucose levels 20 minutes after induction of anaesthesia in both the groups (I&II) was statistically significant. There was significant increase in the blood glucose levels 20 minutes after induction of anaesthesia in both the groups (I&II) (Table II).

The blood glucose levels (mg/dl) in group I and II, 20 minutes after induction of anaesthesia were 108 ± 5.75and 109.6±6.2 respectively. The blood glucose levels were almost similar in both the groups, 20 minutes after induction of anaesthesia and the difference was not statistically significant. (Table III)

IV. Discussion

The present study is undertaken to study effect of duration of fasting on blood glucose level in children. As per the evaluation guidelines, children were kept fasting from midnight and as per 2011 guidelines they were allowed to take fluids before 2 hours of induction of anaesthesia. Our study revealed long hours of fasting results in reduction of blood sugar near to target level of hypoglycaemia (<50mg/dl). Our findings were similar to that of studies conducted by Leila G et al in 1986 [5]

The influence of preoperative starvation on blood glucose concentration in paediatric patients remains controversial. In the study by Thomas [6], the risk of hypoglycemia (defined as blood glucose concentration less than 40mg/dl) increased in children younger than 4 years of age who had prolonged hours of starvation preoperatively. However, Bevan and Burn study in 1973 [7] and Jenson, Wernberg Anderson study in 1982 [8] were unable to confirm that duration of starvation before operation had any influence on preoperative blood glucose concentrations.

Furthermore, studies conducted by J.H. Vander Walt et al [9], Nancy et al [10] on paediatric age group also failed to demonstrate hypoglycemia after preoperative fasting.

As anticipated, all patients receiving glucose containing solutions intraoperatively responded with increase in blood glucose levels. The finding that most children receiving glucose free IV fluids (normal saline) solutions also demonstrated an increase in blood glucose concentration as expected which was studied by Nilsson K et al [11]

P. Gupta et al concluded that clinical signs of hypoglycemia were found to be unreliable in diagnosing hypoglycemia[12]. In our study no cases were reported with symptoms of hypoglycaemia.

V. Conclusion

This was a hospital based study conducted within duration of 2 months. In our study we came to a conclusion that there was hypoglycaemia in patients who had prolonged duration of fasting while those patients who had clear fluid feeds 2hours prior to the surgery did not have. Also all the patients after induction of anaesthesia on giving IV fluids the blood glucose levels were found to be within normal limits. From this study we can say that preoperative fasting duration should be reduced in children to prevent hypoglycaemia. However this study fails to explain in detail about various symptoms that the patients developed on hypoglycaemia.

TABLE –I Comparison of blood glucose levels (mg/dl) before the induction of anaesthesia in group I and II

Group	Glucose level (mg/dl) before induction	t value	P value	Significance
I	54±17.4	13.4347	<0.000	S
II	96.1 ± 4.97			

S- Significant

TABLE–II Comparison of blood glucose levels (mg/dl) prior to induction of anaesthesia with blood glucose levels 20 minutes after induction of anaesthesia in group I and group II

Group	Glucose level (mg/dl) before induction	Glucose level (mg/dl) 20mins after induction	t value	P value	Signifance
I	54±17.4	108 ± 5.75	13.4487	<0.0001	S
II	96.1 ± 4.97	109.6±6.2	9.9749	<0.0001	S

S- Significant

TABLE–III Comparison of blood glucose levels (mg/dl) in group I and II 20 minutes after induction of anaesthesia

Group	Glucose level (mg/dl) 20mins after induction	t value	P value	Significance
I	108 ± 5.75	1.0779	0.2849	NS
II	109.6±6.2			

NS- not significant

References

[1]. American Society of Anesthesiologists: Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: Application to healthy patients undergoing elective procedures–a report by the American Society of Anesthesiologists Task Force on Preoperative Fasting. ANESTHESIOLOGY 1999; 90:896–905

[2]. Bowie MD, Mulligan PB, Schwartz R. Intravenous glucose tolerance in the normal newborn infant: the effects of a double dose of glucose and insulin. Pediatrics. 1963 Apr;31:590–598.

[3]. Allison CW, Cater JI, Gray IG, Staziker AC. Pre-operative starvation in children. The role of alanine in blood glucose homeostasis. Anaesthesia. 1982 Mar;37(3):274–277.

[4]. Srinivasn G; Jain R, Journal of Pediatric Surgery, 1986 , 21(8) , 718-721

[5]. WELBORN L et al. Perioperative Blood Glucose Concentrations in Pediatric Outpatients. Anesthesiology. 1986;65(5):543-546.

[6]. Thomas DKM, British Journal of Anesthesia, 1974 ,46:66.

[7]. Bevan JC; Mary C. Burn, British Journal of Anaesthesia , 1973 ,45:115

[8]. Jensen BH; Wernberg M, British Journal of Anaesthesia, 1982,54:1071

[9]. Vander Walt JH and Carter JA, Anaesthesia and Intensive care, 1986 ,14,352-359.

[10]. Nancy Redfern; Addison GM, Anaesthesia, 1986 ,41,272-275.

[11]. Nilsson K et al. Blood-glucose concentrations during anaesthesia in children. Br J Anaesth. 1984;56(4):375-379.

[12]. Pramod Gupta; Sehgal R, Journal of Anaesthesiology Clinical Pharmacology, 2004,20(2) ,161-163