Title: MATERNAL AND FETAL ACID-BASE STATUS FOLLOWING ELECTIVE CESAREAN SECTION UNDER SPINAL ANESTHESIA: INFUSION OF DEXTROSE VS NON-DEXTROSE SOLUTIONS

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Introduction. Previously, we reported (1) that infants of diabetic mothers who had spinal anesthesia for cesarean section were more acidotic at delivery than those whose mothers had general anesthesia. The fetal acidosis was associated with lactic acidemia, hypercarbia, and maternal hypotension. The hypothesis was raised that hyperglycemia might exacerbate lactic acidemia occurring in response to hypoxia induced by maternal hypotension. In order to determine if hyperglycemia in non-diabetic subjects was related to fetal acidosis, we compared maternal and fetal acid-base states in two groups of patients; one received dextrose containing solution (DS) and the other Ringer's lactate or normal saline (NDS).

Methods. Twenty-seven healthy parturients were studied at the time of elective cesarean section under spinal anesthesia. Thirteen hundred to 1500 ml of 5% dextrose in Ringer's lactate (DS) was infused in 10 of the subjects and 17 received a similar volume of non-dextrose solutions - NDS (Ringer's lactate or normal saline). Left uterine displacement was used in all cases. If hypotension occurred (systolic BP <100 torr or a fall of over 30% from control), it was promptly corrected with ephedrine intravenously. Blood glucose, pyruvate, lactate, B-OH butyrate, pH, PO_2 and PCO_2 were measured in maternal arterial blood (MA) and umbilical artery (UA), vein (UV) blood from a doubly clamped segment of umbilical cord.

Results.

Table 1. Patient Characteristics

	DS	NDS	P
Number of Patients	10	17	
Incidence of hypotension(%)	50	48	NS
Induction - delivery interval (min)	15 ± 3	14 ± 2	NS
Uterine incision-delivery interval (sec)	88 ± 12	94 ± 10	NS
Apgar scores <7(number)			
1 min	1	0	
5 min	0	0	

(*mean ± S.E.)

Table 2. Acid-base and blood gas data

	Non-hypotension			Hypotension		
Number of Patients	DS 5	NDS 9	P	DS 5	NDS 8	P
UA						
pH	7.31	7.31	NS	7.22	7.24	NS
pO_2(torr)	22	20	NS	19	21	NS
pCO_2(torr)	48	50	NS	50	54	NS

Table 3. Biochemical data

Number of Patients	DS 10	NDS 17	P
MA			
glucose(mg/dl)	342 ± 24*	62 ± 4	<0.001
pyruvate(μM/L)	304 ± 41	116 ± 10	<0.001
lactate(μM/L)	1955 ± 182	909 ± 64	<0.001
B-OH butyrate (μM/L)	400 ± 170	1076 ± 203	<0.001
UV			
glucose(mg/dl)	248 ± 20	55 ± 3	<0.001
pyruvate(μM/L)	176 ± 13	125 ± 15	NS
lactate(μM/L)	1746 ± 162	1292 ± 85	<0.05
B-OH butyrate (μM/L)	259 ± 81	395 ± 61	NS
UA			
pyruvate(μM/L)	203 ± 30	135 ± 17	NS
lactate(μM/L)	1908 ± 145	1612 ± 196	NS
B-OH butyrate (μM/L)	184 ± 53	287 ± 43	NS

(*mean ± S.E.)

Significantly higher maternal levels of glucose, pyruvate and lactate were found in the DS group. There was however no significant difference in maternal artery pH between the two groups. Despite higher glucose and lactate values in the umbilical vein of the DS group, there was no difference in pH. UA values showed no differences.

Discussion. Our results show that in non-diabetic parturients given spinal anesthesia for cesarean section, hyperglycemia due to rapid dextrose infusion does not exacerbate the mild neonatal acidosis associated with transient maternal hypotension.

Reference.

1. Datta S, Brown WU: Acid-base status in diabetic mothers and their infants following general or spinal anesthesia for cesarean section. ANESTHESIOLOGY 47: 272-276, 1977.