Date

Title : HEPATIC FUNCTION AFTER HALOTHANE IN NEONATES AND INFANTS

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Introduction. Halothane has been implicated as a possible cause of hepatitis, albeit, in rare and sporadic instances. The National Halothane Study, showed that a single exposure to halothane was associated with hepatic necrosis in 1.02/10,000 adults.[1]

No study of the incidence of halothane-related hepatitis in neonates and infants has been reported. The youngest reported case was in a 5 month old infant although signs and symptoms resembled liver dystrophy rather than halothane toxicity.[2]

Clinical signs of halothane-related hepatitis usually appear within 2 weeks post-exposure, and is characterized by symptoms resembling viral hepatitis.[3] Enzyme changes are known to be maximum within 3-4 days after hepatic insult.

This preliminary report documents biochemical indicators of hepatic function before and immediately after halothane exposure in neonates and infants. The influence of the patient's age, and duration of exposure to halothane were evaluated.

Method. Surgical patients, age 1 to 90 days, under halothane anesthesia (N_2O-O_2-Halothane, non-rebreathing system) were included in the study (with informed consent and approval by the Health Sciences Review Committee on Investigations Involving Human Subjects). Patients with pre-existing liver disease, previous blood transfusion and congenital anomalies were excluded.

Biochemical parameters of hepatic function were determined from 1.5 ml blood samples drawn before and immediately after halothane anesthesia (HA). These include total (B_T) and direct bilirubin (B_D), serum albumin (ALB) reserve serum albumin binding capacity as reflected by binding of Hydroxybenzene-azo-benzoic acid (HBABA), Serum glutamic pyruvic transaminase (SGPT) and Gamma-glutamyl transpeptidase (GGTP). Normal values in our laboratory are less than 1 mg/dl, 2.7-5 mg/dl, 25-120%, 9-40 u/L, and 9-50 u/L respectively.

Results. This preliminary report is based on available data on 8 patients, 2 females and 6 males. Age at surgery ranged from 18 to 91 days with a mean of 60.9 ± 12.3 (SE). Halothane exposure time ranged from 40 to 210 (85.6 ± 21.1) minutes.

Eight patients had hepatic function tests before and immediately after surgery (Table 1).

Total and direct bilirubin were normal pre-operatively and did not change after halothane. Serum albumin was normal in 6 patients and was unchanged post-operatively. In one patient a slight elevation pre-operatively was normal after 45 minutes of halothane exposure. Levels of HBABA were normal in all patients and remained unchanged after surgery.

SGPT was normal pre- and post-operatively. GGTP was normal in 6 patients and remained normal post-operatively. GGTP elevations in 2 patients pre-halothane decreased but did not return to normal after halothane exposure.

Statistical analysis was performed using Student's "t" test for paired data. "P" values were not significant.

Conclusion. No immediate biochemical change of hepatic function was detected in neonates and infants 18-90 days old following 40-210 minutes of halothane exposure. Hepatic function tests in our study were not altered by age, duration of halothane exposure, or pre-existing abnormal liver functions. Further studies will validate these conclusions.

References.

1. Bunker JP, Forrest WH, Mostsetter F, Vandam LD: The National Halothane Study: A study of the possible association between halothane anesthesia and post-operative necrosis. Bethesda, National Institute of General Medical Sciences, 1969.

2. Smith RM: Anesthetic complications in Smith RM (ed.) Anesthesia for infants and children. C. V. Mosby Co., St. Louis, Missouri., pp. 611-612, 1980.

3. Moult PJA, Sherlock S: Halothane-related hepatitis: A clinical study to twenty-six cases. Quart. J. Med., 173, 99., 1975.

TABLE 1: Liver Function with Halothane

Age/ days Sex/ (M/F)	Exp. Time (min)	Sample Time Pre-H or Post-H	$B_{(T)}$ $B_{(D)}$	HBABA	ALB	SGPT	GGPT
25	85	Pre-	.5/0	96	3.6	28	91
F		Post-	.5/0	92	3.6	29	84
34	105	Pre-	1/0	84	3.5	22	43
F		Post-	.5/0	84	3.5	39	40
49	80	Pre-	.8/2	92	3.8	19	60
M		Post-	.5/2	84	3.2	19	56
90	40	Pre-	.5/0	108	4.2	18	24
M		Post-	.5/0	104	4.7	22	27
90	80	Pre-	.5/0	104	4.7	14	45
M		Post-	0/0	100	4.3	18	48
91	40	Pre-	.5/0	92	4.1	20	30
M		Post-	0/0	90	3.6	26	20
90	45	Pre-	0/.2	100	6.0	21	15
M		Post-	0/0	96	3.5	35	19
18	210	Pre-	0/0	76	3.5	30	25
M		Post-	0/0	80	2.7	38	30
		t		1.3	0.54	1.4	1.76	0.44
		P		>0.1	>0.6	>0.1	>0.7	>0.6