

Title: THE EFFECT OF ALCOHOL USAGE ON THE INDUCTION DOSE OF THIOPIENTAL

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Introduction. Thiopental, the most commonly used intravenous anesthetic agent, is well known for the cardiorespiratory depression that it produces especially in the elderly or poor risk patient. Animal work suggests that regular alcohol produces resistance to the anesthetic but not the cardiorespiratory effects of anesthetic drugs¹. The situation in man is however unclear, Loft et al² showing that regular alcohol use increased the induction dose of thiopental in women undergoing termination of pregnancy but Tammisto and Tigerstedt³ were unable to demonstrate any such effect. More recently Swerdlow and Holly using spectral edge analysis concluded that alcohol intake does not influence the induction dose of thiopental⁴. These studies were all carried out on small groups of patients which did not reflect the wide spectrum of routine clinical practice. Because of the conflict of findings the present study was carried out to investigate the effect of alcohol consumption on thiopental induction doses in patients presenting for a range of elective surgical procedures using an established method of assessment⁵.

Method Over 500 unpremedicated, healthy patients (ASA I-II) of both sexes were studied. Ages ranged from 20-89 yr and weights from 40-85 kg. They were questioned about their alcohol consumption and subsequently classified as either a drinker or a non-drinker. Non-drinkers were abstainers or those who drank only on rare occasions while drinkers were those who drank more than the equivalent of 4 units of alcohol (40 g) per week or who had drunk more than 12 units (120 g) in the previous month.

Thiopental 2.0 mg kg⁻¹ was injected into a large forearm vein over 20 s. At 15 s intervals thereafter 25 mg increments were given until the eyelash reflex was abolished or contact was lost with the patient and the total dose of thiopental administered was taken as the 'induction dose'.

Since the patient's age may influence the induction dose⁵ the findings are presented in decades of age. Results were statistically analysed using the independent samples t-test and multiple regression analysis.

Results Table 1 shows that those patients regularly consuming alcohol require significantly larger doses of thiopental to induce anaesthesia. Since the induction dose showed some evidence of a positive skew distribution the data were log-transformed (Table 2). This follows a similar pattern to Table 1.

Multiple regression analysis indicated that, after adjustment for differences in age and weight distribution, men who were heavy users of alcohol (more than 40 g daily) required 33% (95% confidence limits 22-46%) more thiopental for induction than

non-drinkers, and women 44% (26-64%).

Table 1 Mean±SEM induction dose (mg kg⁻¹) of thiopental in drinkers and non-drinkers by age decades.

yr	Non-drinkers (n)	Drinkers (n)	P <
20-	4.5±0.16 (64)	5.6±0.27 (27)	0.001
30-	4.1±0.16 (53)	5.6±0.25 (29)	0.001
40-	4.3±0.16 (46)	5.1±0.30 (28)	0.01
50-	3.9±0.14 (52)	4.7±0.21 (26)	0.001
60-	3.3±0.10 (80)	4.4±0.23 (14)	0.001
70-	3.0±0.09 (61)	3.6±0.22 (14)	0.01
80-	2.9±0.12 (34)	3.6±0.32 (4)	0.06

Table 2 Log transformation of data in Table 1.

yr	Non-drinkers	Drinkers	P <
20-	1.46±0.04	1.69±0.05	0.001
30-	1.37±0.04	1.68±0.04	0.001
40-	1.44±0.04	1.59±0.05	0.02
50-	1.33±0.04	1.53±0.04	0.001
60-	1.17±0.03	1.45±0.05	0.001
70-	1.07±0.03	1.25±0.07	0.01
80-	1.03±0.04	1.27±0.09	0.07

Discussion This study clearly demonstrates increased barbiturate requirements in subjects who consume more than 40 g of alcohol weekly. Our findings are a clear reflection of the situation confronting the clinical anesthesiologist where those requiring larger doses of thiopental may be less able to tolerate them. It is unlikely that they could be explained on a pharmacokinetic basis, but rather by the resistance of a cerebrum which has acquired tolerance to alcohol.

References

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