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# The Influence of Obesity and Fat Distribution on Induction and Maintenance Doses of Propofol

*(Short communication)*

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Propofol is the newest intravenous anaesthetic agent.It is however a clinical impression that both the optimal induction and maintenance doses of propofol show great individual variations.

Patients scheduled for gynaecological laparotomies (n=81) and laparoscopies (n=96) were included in the study. The patients undergoing laparotomies were older than the laparoscopy group (46 ± 13 vs 33 ± 7.3 years, $p<0.0001$,t-test), but body weight, body mass index or abdominal circumference were similar.

All patients were premedicated with 0.1 mg/kg of diazepam orally and 1 mg/kg pethidin i.m. Sleep was induced by an infusion of propofol 2 mg/kg body weight over 30 seconds. If the patient lost consciousness (defined as loss of eyelash reflex) before the predicted dose minus 20 mg had been given the dose was regarded as too high, while the induction dose was regarded insufficient if the patient was not asleep after the predicted dose had been given.

After induction of sleep propofol was given as a continuous infusion at a speed of 10 mg/kg/h which was gradually decreased to 6 mg/kg/h over 20 minutes (5).Two μg/kg body weight of fentanyl were given as analgetic. All patients were intubated after vercuronium, 0.1 mg/kg ,and mechanically ventilated. No nitrous oxide or volatile agents were used in the study. Neostigmine was given at the end of the operation.

The maintenance dose of propofol was regarded as insufficient if autonomic responses indicated that too light an anaesthesia appeared during surgery.

Before anaesthesia, age, length, weight and abdominal circumference at the umbilical level were recorded. Body mass index (BMI) was defined as body weight (kg) divided by squared height ($m^2$). The time from discontinuation of propofol infusion to the extubation was denoted extubation time.

The induction dose was found to be optimal in 66 % of the patients, insufficient in 15 % of the patients and too high in 19 % of the patients and was

inversely related to age ($p<0.001$) and BMI ($p<0.0005$) in multiple regression analysis.

The maintenance dose of propofol was found to be sufficient in 84 % of the patients and was significantly related to the BMI/abdominal circumference ratio ($p<0.05$) in that patients with the body mass located mainly at the abdominal site were at a greater risk to receive an insufficient maintenance dose.

The extubation time was significantly longer in the laparotomy group (8.1±4.6 vs 10.0±5.6 min,$p<0.01$,t-test). In the laparoscopy group the extubation time was correlated to the body mass distribution ($p<0.05$) in such a way that a non-abdominal distribution of body mass was associated with a short extubation time.

The present study suggests that the induction dose should be reduced in the elderly and the obese. The finding that elderly show an exaggerated response to an induction dose of propofol has previously been described (2). This has been attributed to a decreased volume in the central compartment (3).

Also body composition was found to be an important factor. In obese subjects the central compartment is over-estimated by the means of body weight and therefore a decreased induction dose should be used. Abdominal adipose tissue has been shown to be metabolically more active than fat distributed in the periphery (4) . It thus appears as if the clearance of propofol is favoured by an abdominal distribution of body fat and that additional attention should be paid to such patients in order to obtain sufficient anaesthesia.

A prolonged recovery time after anaesthesia with propofol has been described in morbidly obese patients after at least one hour of surgery (1). In the laparoscopy group a short recovery time was associated with a non-abdominal distribution of body mass.

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