

Title: ALFENTANIL - LOADING DOSE/CONTINUOUS INFUSION FOR SURGICAL ANESTHESIA

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Introduction. Alfentanil, a new synthetic derivative of fentanyl, has an onset of action three times that of fentanyl and an elimination (β) half-life one-third that of fentanyl.¹ This suggests alfentanil as possibly a valuable drug for induction of anesthesia (if given by intravenous bolus) and for maintenance of anesthesia (if given by continuous infusion). The goals of this study were to determine: 1) the cardiovascular response to endotracheal intubation and incision following induction of anesthesia with a loading dose of alfentanil combined with a reduced dose of thiopental, and 2) the clinically effective dose range for alfentanil infusion when combined with N₂O for maintenance of anesthesia.

Methods. Nineteen adult patients, ASA class I-III, scheduled to undergo a variety of surgical procedures expected to last at least one hour were studied. Informed consent was obtained from each patient. All patients received po diazepam 10mg, 90 minutes prior to induction of anesthesia. After application of the usual monitors, the patients received pancuronium, 1.25mg/50kg, IV, and were preoxygenated. Anesthesia was induced with alfentanil 50mcg/kg, IV, followed by thiopental 2mg/kg, IV. Endotracheal intubation was facilitated with succinylcholine, 1.5mg/kg. Ventilation with N₂O/O₂ (60%/40%, inspired) was controlled and relaxation was maintained with pancuronium. Following intubation, an infusion of alfentanil was begun at a rate of 1.0, 1.5, or 2.0mcg/kg/min with a Valleylab infusion pump and surgery was allowed to proceed. Intraoperatively, the alfentanil infusion rate was adjusted to 0-3.0mcg/kg/min as clinically indicated. At the conclusion of the surgical procedure, N₂O and the infusion of alfentanil were discontinued, muscle relaxation was reversed, and the patients were extubated and taken to the recovery room. Measurements of blood pressure and pulse were recorded at the following times: 1) on entrance to the operating room (control); 2) after the loading dose alfentanil (50mcg/kg); 3) after thiopental; 4) after endotracheal intubation; 5) after incision; and 6) at 5 minute intervals during the alfentanil infusion. Statistical significance of changes from control were determined with Student's t test for paired data.

Results. Grouped data for mean blood pressure (BP) and heart rate (HR) are shown in Table I. The induction dose of alfentanil

and thiopental produced significant decreases in BP. BP remained significantly decreased from control after intubation and was unchanged following incision. A significant change in HR occurred only after incision.

Table I

		Control	Post-Alf.	Post-Thio.	Post-Int.	Post-Incis
BP	\bar{X}	99.5	93.8*	82.6*	91.3*	95.4
	\pm SD	19	20	17.7	18	18
HR	\bar{X}	82	79.4	78.7	84	74*
	\pm SD	11	14	9.3	18	16.5

Duration of alfentanil infusion average 170 minutes (31-579). Intraoperatively alfentanil infusion rates were continued unchanged from the initial rate in 11 patients, increased in 8 patients (patient movement-5, \uparrow BP-2, or \uparrow HR-1), and reduced in 4 patients (\uparrow HR-2, or \uparrow BP-2). Table I indicates for all patients the percentage of time that each infusion rate was employed.

Table II

	Infusion Rate (mcg/kg/min)						
	0	0.5	1.0	1.5	2.0	2.5	3.0
	0%	17%	31%	26%	16%	5%	2%

Discussion. Induction of anesthesia with loading dose of alfentanil (50mcg/kg) combined with a reduced dose of thiopental was effective in preventing a "stress response" to intubation and incision, but produced chest wall rigidity in 3 of 19 patients. From the range of alfentanil infusion doses required intraoperatively it is likely that there is no single infusion rate which is ideal for all patients. The most commonly employed infusion rates were 1-1.5mcg/kg/min. Speed of emergence from this anesthetic technique is rapid in most patients and seems not to vary with the length of infusion period. Naloxone was employed to assist emergence in 2 of 19 patients and was required in the recovery room in 2 additional patients. We believe this anesthetic regimen, employing alfentanil bolus/infusion, has great potential for a variety of surgical procedures.

References.

1. Bovill, JG, Sebel PS, Blackburn CL, et al; Anesthesiology 55:A174, 1981.