

Title: EFFECT OF FENTANYL, MORPHINE, MEPERIDINE, BUTORPHANOL AND NALOXONE ON COMMON BILE DUCT PRESSURE

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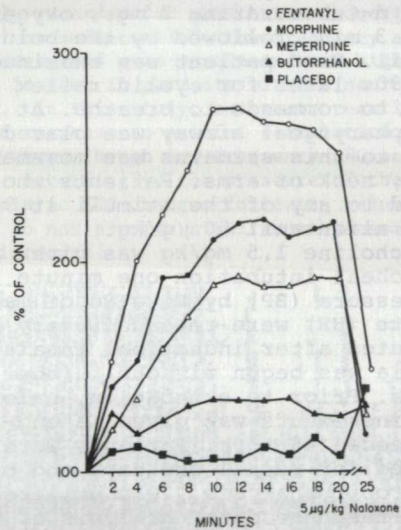
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**Introduction.** The purpose of this study was to determine the effect of fentanyl (0.1 mg/70 kg), morphine (10 mg/70 kg), meperidine (75 mg/70 kg) and butorphanol (2 mg/70 kg) on common bile duct pressure in humans and the reversal of their action by naloxone (0.35 mg/70 kg).

**Methods.** Fifty patients (ASA I and II) ranging in age from 24 to 74 (mean 43.7) were randomly assigned to five groups, 10 each. This investigation was approved by the Institutional Review Board and all patients signed an informed consent. Premedication consisted of 20 mg diazepam p.o. 60 minutes before the contemplated anesthesia induction time. Anesthesia consisted of thiamylal induction and ethrane N<sub>2</sub>O-O<sub>2</sub> maintenance, as this anesthesia does not change common bile duct pressure<sup>1</sup>. After pretreatment with 1 mg pancuronium i.v. 1 mg/kg succinylcholine was given i.v. to facilitate endotracheal intubation. Pancuronium was used for surgical relaxation. Patients were mechanically ventilated at a rate of 12/minute and a tidal volume of 8 ml/kg. Ethrane was discontinued about 1-2 minutes before one of the drugs or placebo was injected i.v. over 60 seconds. Common bile duct pressures, as an index of the tone of the sphincter of Oddi, were obtained intraoperatively in patients undergoing elective cholecystectomy by intubating the common bile duct. This was done by inserting a 12 inch 16 gauge angiocath via the cystic duct. The catheter was filled with saline and connected to a Statham P23ID transducer - Datascope 870 - Datascope writer Model M-22CAHA for pressure recording. After determining the control pressure, one of the five listed compounds was injected i.v. and the results observed for 20 minutes. At this point naloxone was given and its effect noted after 5 minutes.

**Results.** The effect of the analgesics on the common bile duct pressure as a percentage of control, is shown in the figure. The effect of fentanyl peaked at 10, morphine at 14, meperidine at 12 and butorphanol at 16 minutes. The increases in pressure were 173, 111, 94 and 35 per cent, respectively. Compared to butorphanol, the highest percentage increase of the other three drugs was statistically significant (fentanyl and morphine p<0.001 and meperidine p<0.05). The control pressure ranged between 7 and 14 torr (mean 8.6±0.4). These

values are within the limits of normal in the human bile duct<sup>2</sup>. Naloxone lowered the common bile duct pressure from the levels reached 20 minutes after the administration of fentanyl, morphine and meperidine (p<0.001, 0.001 and 0.01 respectively). There was a slight increase following butorphanol and placebo which was statistically not significant.



**Conclusion.** Whereas all three narcotics increased biliary ductal pressure, butorphanol had an insignificant effect. On this basis, butorphanol might be a satisfactory analgesic agent for gall bladder colic and could be considered as a component of balanced or neurolept anesthesia for biliary surgery. Naloxone reversed the spasm of the sphincter of Oddi as indicated by the drop in pressure caused by all three narcotics. The effect was statistically significant.

**References.**

1. Radnay PA, Brodman E, Mankikar D, Dunclaf D: The effect of equi-analgesic doses of fentanyl morphine, meperidine and pentazocine on common bile duct pressure. *Anaesthesist* 29:26-29, 1980
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