

**TITLE :** EFFECTS OF FENTANYL ON PULMONARY RESISTIVE PROPERTIES. AN OCCLUSION METHOD STUDY.

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The effects of fentanyl (F) on the resistive properties of the lung were studied by using the rapid airway occlusion during constant flow inflation in myorelaxed anesthetized patients. This technique allows measurement of the intrinsic resistance ( $Rrs$ ,  $min$ ) and of the additional resistance ( $\Delta Rrs$ ) due to time constant inequalities and/or to stress recovery of the lung tissues (1,2).

Ten ASA I men (age :  $30 \pm 8$  years ; weight :  $69,7 \pm 5,9$  kg), subjected to minor urologic procedures but declining epidural anesthesia gave informed oral consent and were studied.

#### Protocol :

Premedication : midazolam 5 mg IM on call.

IV general anesthesia was induced with methohexital ( $3,85 \pm 0,5$  mg/kg) and vecuronium bromide. Intubation was performed with a tube fitted with a lateral port (Portex, 8 mmID) in order to measure tracheal pressure. Mechanical ventilation (Siemens Servo 900 D) was set to :  $F_iO_2$  0,3 in nitrogen,  $V_T/T_I = 0,6$  l/sec. BP, HR and  $Stc\ O_2$  were monitored.

Static compliance ( $Cst$ ,  $rs$ ),  $Rrs$ ,  $min$  and  $\Delta Rrs$  were measured :  $8,25 \pm 2,4$  min after induction [control],  $6,6 \pm 1,8$  min after a first dose of F ( $4,9 \pm 0,4$   $\mu$ g/kg) [T1], and  $6,1 \pm 1,4$  min after F ( $1,75 \pm 0,3$   $\mu$ g/kg) and atropine (A) (1 mgIV) [T2].

**Results :**  $Cst$ ,  $rs$  remained stable.  $Rrs$ ,  $min$  increased with F and decreased under control value with F + A.  $\Delta Rrs$  increased with F but remained stable in spite of A.

	Control	T1 (F)	T2 (F + A)
$Cst\ rs$ (ml/cmH <sub>2</sub> O)	$84.4 \pm 17.4$	$83 \pm 17^{NS}$	$83 \pm 17^{NS}$
$Rrs, min$ (cmH <sub>2</sub> O. sec/l)	$1.59 \pm 0.47$	$2.15 \pm 0.8^{**}$	$1.40 \pm 0.55^{***}$
$\Delta Rrs$ (cm H <sub>2</sub> O. sec/l)	$2.03 \pm 0.55$	$2.72 \pm 0.5^{**}$	$2.55 \pm 0.6^{NS}$

two-tailed signed rank test : \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

#### Conclusions :

Resistance to airflow increases with F in myorelaxed patients by two mechanisms :

- F increases  $Rrs$ ,  $min$ . Action of A suggests an impact on bronchomotricity.
  - F *per se* increases time constant inequalities and/or modifies stress recovery properties of the lung tissues.
- Appl Physiol 58 : 1840-1848, 1985
  - Appl Physiol 57 : 2556-2564, 1989

## A1149

**TITLE :** CO<sub>2</sub> DIFFUSION : COMPARISON BETWEEN INTRA OR EXTRAPERITONEAL INJECTION

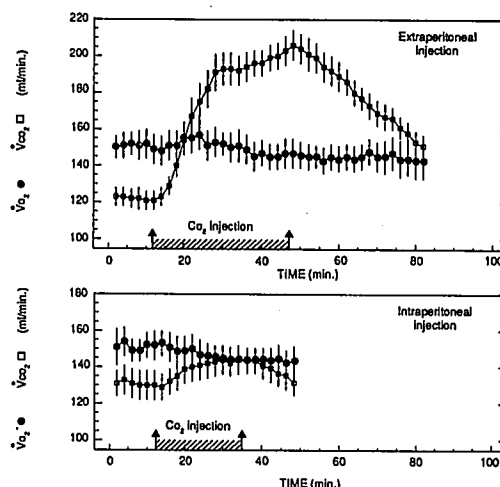
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Several studies have shown that CO<sub>2</sub> peritoneal insufflation performed during general anesthesia for laparoscopy is associated with an increase in end tidal CO<sub>2</sub> (PETCO<sub>2</sub>). This is attributed to the CO<sub>2</sub> diffusion from the peritoneal cavity in mechanically ventilated patients having constant alveolar ventilation. In order to facilitate some surgical procedures such as extraperitoneal pelviscopy to obtain biopsy specimens from the pelvic lymph nodes, extraperitoneal insufflation of CO<sub>2</sub> has been proposed<sup>1</sup>. The aim of the current study was to compare the diffusion of CO<sub>2</sub> after intra or extraperitoneal injection.

After institutional approval and informed consent, 21 female patients were enrolled in the study and underwent laparoscopy (n=10) or extraperitoneal pelviscopy (n=11). All patients were anesthetized with propofol (2 mg/kg as bolus followed by continuous infusion), fentanyl and atracurium. They were mechanically ventilated ( $V_T=10$  ml/kg, Respiratory rate=12). Oxygen consumption ( $\dot{V}O_2$ ), carbon dioxide output ( $\dot{V}CO_2$ ) and PETCO<sub>2</sub> were continuously measured by using a mass spectrometer system<sup>2</sup>. Non invasive arterial blood pressure and heart rate were also recorded. Results were expressed as mean $\pm$ SE and compared by analysis of variance.

**RESULTS.** No variation was observed for the mean arterial blood pressure and heart rate for the two groups after infusion of CO<sub>2</sub>.  $\dot{V}O_2$  was constant throughout the anesthesia, whereas  $\dot{V}CO_2$  and PETCO<sub>2</sub> increased soon after CO<sub>2</sub> injection. However these increases were significantly different in laparoscopy and pelviscopy: 11 and 68 % for PETCO<sub>2</sub>, and 10 and 64 % for  $\dot{V}CO_2$ , respectively.



**CONCLUSION.** 1) The diffusion of CO<sub>2</sub> in the body depends on its site of administration. 2) The amount of CO<sub>2</sub> diffused is larger after extraperitoneal injection. This diffusion should be taken into account in patients with impaired respiratory function undergoing such surgical procedures under locoregional anesthesia.

1-J Urol 124:245-248, 1980

2-Acta Anaesthesiol Scand 32:691-697, 1988