Comparison of Low-Pressure vs. Standard-Pressure pneumoperitoneum laparoscopic cholecystectomy on postoperative pain and quality of recovery

Barrio J, García L, Sellés R, San Miguel G, Errando CL, Gallego J
Hospital Arnau de Vilanova (Valencia), Dept of Anaesthesiology, Valencia, Spain

WHY LOW-PRESSURE LAPAROSCOPY (IAP<9mmHg)?

- Experimental assays support that low-pressure pneumoperitoneum can have a beneficial effect on the recovery of injured tissues, peritoneal cancer spread and postoperative complications like adhesion syndromes or fibrosis (Matsuzaki et al.)
- The recommendations stated by the European Association for Endoscopic Surgery include working with the lowest possible intra-abdominal pressure allowing adequate exposure of the operative field.
- Low-pressure laparoscopy is considered an intervention for improving patient outcome: fewer adverse effects (pulmonary/haemodynamics), less shoulder / postoperative pain.

HOWEVER, the impact of Low-Pressure laparoscopy on patient outcome remains controversial: there are no definitive conclusions about safety and overall evidence with respect to reduction of postoperative pain and hospital stay is not conclusive.

The GOAL OF THE STUDY was to compare the effect of Low-Pressure (8 mmHg) and Standard-Pressure (12 mmHg) pneumoperitoneum on major intraoperative complications, postoperative pain, analgesic requirements, quality of recovery and discharge on the first 24h after surgery, when performing Laparoscopic Cholecystectomy (LC).

MATERIAL AND METHODS: RANDOMIZED DOUBLE-BLINDED CLINICAL TRIAL

90 patients (60f/30m, ASA 1-2, 49,8±11,7 y, normal-range BMI) scheduled for elective LC were randomly allocated into 2 groups (55/35):

Low-Pressure LC (IAP 8mmHg) and **Standard-Pressure LC (IAP 12 mmHg)**.

- **Intraoperative analgesia** consisted of fentanyl-remifentanyl, paracetamol, dexketoprofen and wound infiltration with levobupivacaine.
- **Postoperative analgesia** included paracetamol and dexketoprofen. **Morphine rescue** was used if VAS score (0-10) was ≥ 5 .
- **Nausea/vomiting prophylaxis** included dexamethasone and ondansetron. Rocuronium/sugammadex was used as **NMB / Reversion**.
- Three experienced **surgeons** (**Blinded** to IAP setting) performed all the surgeries.
- **Three Anaesthetists blinded** to IAP setting evaluated (1h,6h and 24h or discharge) postoperative abdominal/shoulder Pain-VAS score, analgesic requirements (% Morphine Rescue), Quality of recovery (QoR15 score) and Discharge.

RESULTS: No differences in demographic data were observed within the groups. There were **NO major intraoperative complications** (Bleeding or Bile duct injury) in any group.

A-Postoperative Pain:- Low Pressure LC showed lower VAS scores, which were statistically significant at 1h (*p= 0.008) and 24h (***p=0,01), M-W. No at 6h (**p=0,061).

-Morphine rescue was significantly higher for Standard-Pressure LC than for Low-Pressure LC (5,5% vs 25,7%, p=0,006, X²).

-% of patients with VAS score <2 (Low Pain) during the hole procedure was higher in Low-Pressure LC (41,8% vs 21,1%).

C- Quality of Recovery (Test QoR15): Low-Pressure LC showed statistically better quality of recovery according to QoR15 score than Standard-Pressure LC (*p=0,031, **p=0,019, ***p=0,016, MW).

Discharge (<24h):- Average discharge on the first 24h after surgery was 90%. No statistical differences were observed between Low-Pressure and Standard-Pressure LC (94,5% vs 82,9 %, p=0,085, Fisher).

- Patients with discharge <24h had statistically lower VAS scores for Abd Pain (24h: 0,9vs2,5,p=0,002 MW) and higher QoR15 scores (24h: 144vs129, p<0,001,MW), independently of IAP of Pneumoperitoneum.

B-Shoulder Pain: - Incidence of shoulder pain was higher for Standard-Pressure than for Low-Pressure LC, but it did not reach statistical significance (*p=0,315, **p=0,114, X²).
- VAS scores for shoulder pain were comparable for both groups.

CONCLUSIONS:
-Low-pressure LC was associated with lower VAS scores for abdominal pain, lower postoperative morphine requirements and better quality of recovery than Standard-pressure LC, with no differences in shoulder pain (incidence/VAS score).
-The magnitude of the clinical effect could be low as it did not influence discharge on the first 24h after surgery.
-Lower VAS scores and higher levels of quality of recovery (QoR15 score) were positively associated with discharge on the first 24h after the surgery, independently of IAP of the Pneumoperitoneum.