



# Initial Experience Using Incisional Anesthetic Catheter In Abdominal Wall Ambulatory Surgery

Castro Diez, Laura<sup>1\*</sup>, García Jiménez, Maria Lourdes<sup>1</sup>, Juncal Díaz, Jorge Luis<sup>2</sup>, López Álvarez Servando<sup>2</sup> and Noguera Aguilar, Jose Francisco<sup>1</sup>

<sup>1</sup>General Surgery Service, Ambulatory Surgery Unit, Spain

<sup>2</sup>Anesthesia Service, Ambulatory Surgery Unit, Spain

\*Corresponding author: Castro Diez Laura, General Surgery Service, Ambulatory Surgery Unit, A Coruña, Spain

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## Abstract

**Objectives:** Abdominal wall pathology, such as inguinal and umbilical hernias, is one of the most prevalent pathologies in the field of General Surgery, with interventions being carried out more and more within outpatient Major Surgery programs. Nevertheless, this pathology is not free from postoperative morbidities or complications, such as postoperative pain, which sometimes requires a longer hospital stay. We present our initial experience using incisional anesthetic catheters in patients who underwent an inguinal or umbilical hernia and analyze various postoperative parameters related to pain and the functional limitation it causes in the patient.

**Material and Methods:** We intervened a consecutive series of 20 patients with an average age of 60 years with abdominal parietal defects, 15 with a diagnosis of inguino-crural hernia, and 5 with an umbilical or ventral hernia who underwent anterior repair with intraoperative placement of an ON-Q® SilverSoaker catheter. It is a postoperative analgesia system based on the infusion and release of drugs at the surgical wound level that allows the administration of a variable dose of local anesthetic with a predetermined cadence. In our case, we made a continuous infusion during the first 60 postoperative hours of 10 ampoules of Levobupivacaine 0.75mg diluted in 200 mL of saline.

**Results:** We analyzed the results of postoperative pain at discharge, 24 hours and 48 hours with VAS of 0-1 in all patients who were also discharged in less than 8 hours in an Ambulatory Surgery Program and who did not require opioids for controlling the pain. Neither infectious nor mechanical complications of the catheter were recorded, making home management of the system comfortable for patients. Only one patient presented subcutaneous edema in the inguinal incision area which was completely resolved with conservative management.

**Discussion:** Therefore, it is a simple system that improves the postoperative needs of oral pain relievers, allows the patient to ambulate early and in some cases shortens the hospital stay, resulting in a discharge in Surgery units without admission.

**Keywords:** Surgery; abdominal wall; pain; catheter; ambulatory surgery

## Objectives

Abdominal wall pathology, such as inguinal and umbilical hernias, is one of the most prevalent pathologies in the field of General Surgery, with interventions being performed more and more in Ambulatory Surgery programs (AS). Surgical repair of the abdominal wall is not exempt from postoperative complications, such as postoperative pain, which in some cases requires a hospital stay longer than expected. Pain is also related to an increase in

unanticipated admissions and readmissions after discharge from ambulatory surgery. The incidence of unanticipated admissions is estimated between 0.3 and 9.5%, the main reason being the presence of uncontrolled pain. Between 1 and 5.7% of patients discharged after AS go to hospital within 30 days of surgery due to pain, increasing the direct costs of the process [1,2]. The management of this pain must be carried out in a multimodal

program, with an effective and safe alternative to intravenous or oral opioid management, which is the infiltration of local anesthetic in the incision area. The short duration of local anesthetics requires continuous infiltration of these drugs, which can be achieved with the placement of a catheter at the level of the surgical wound connected to a local anesthetic infusion pump.

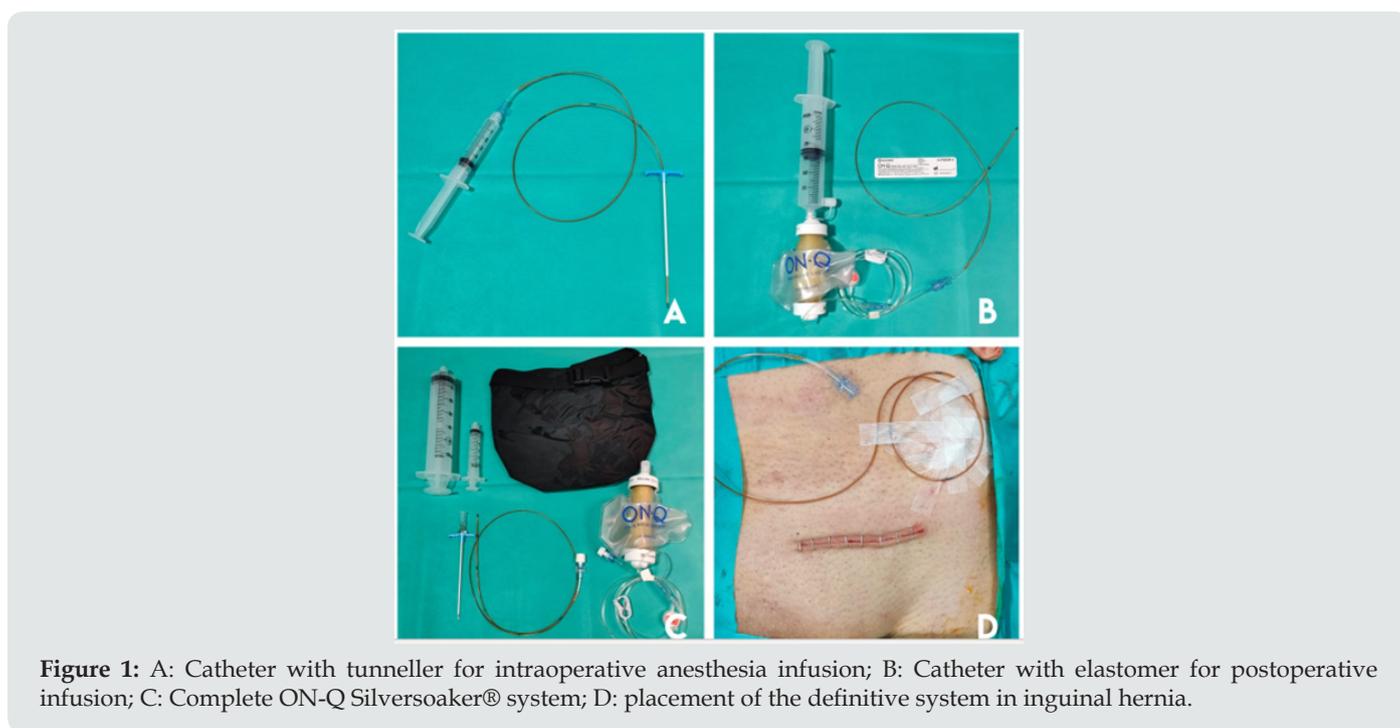
The continuous infusion of local anesthetic in a surgical wound was described for the first time by Capelle in 1935 and investigated by Blades and Ford in 1950 for thoracotomies [3,4], confirming the findings with upper abdominal wounds in later studies (Gerwig, Thompson and Cuchillas, 1951; Lewis and Thompson, 1953). However, the technique did not become very popular for fear of possible infection or poor wound healing. Their study for pain control after inguinal hernia repairs was already carried out by the group of Michael J Schurr et al. in 2004, concluding its effectiveness at least in the first 24 postoperative hours [5]. At present, the availability of safe elastomeric pumps and the improvement of catheters, has renewed the use of this technique for the treatment of postoperative pain from multiple surgical procedures. Among the possible complications associated with the use of incisional catheters, surgical wound infection, postoperative hematoma, delayed healing and reactions to a foreign body or local anesthesia stand out. However, several studies have included these variables and none of them has correlated the placement of a local anesthetic catheter with a higher risk of complications [5,6]. We present our initial experience using incisional anesthetic catheters in patients who underwent surgery for inguinal or ventral hernia and analyze various postoperative parameters related to pain and the functional limitation it causes in the patient.

### Material and Methods

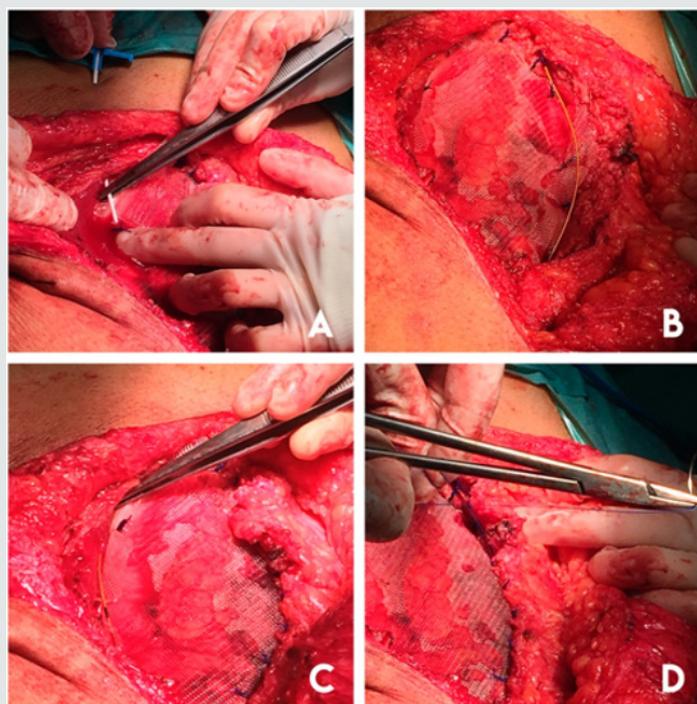
We intervened a consecutive series of 20 patients with a mean age of 60 years with abdominal parietal defects, 15 with a diagnosis of inguocrural hernia and 5 umbilical or ventral, who underwent anterior repair with intraoperative placement of an ON-Q® SilverSoaker catheter as reflected in Table 1. As exclusion criteria, anticoagulation or antiplatelet therapy, the existence of a recurrent inguinal or ventral hernia, that the technique be performed by laparoscopic approach, or a cognitive deficit of the patient or lack of adequate family support were decided. The technique consists of a postoperative analgesia system based on the infusion and release of drugs at the surgical wound level that allows the administration of a variable dose of local anesthetic with a predetermined cadence. In our case, we performed a continuous infusion during the first 60 postoperative hours of 10 ampoules of Levobupivacaine 0.75mg diluted in 200 mL of physiological saline. For the placement of the local analgesia infusion system, we used the ON-Q® Pump kit (distributed by B.Braun Medical SA) of an antimicrobial catheter and elastomeric infusion pump device (Figure 1). We place the catheter in the subfascial region, prior to the fascial and subcutaneous closure of the wound, which allows the blocking of nociceptive impulses from both the fascia and the muscles and the peritoneum (Figure 2).

**Table 1:** Surgical procedures in which an incisional catheter has been placed for postoperative analgesia.

	N	Men	Women	Age
Inguinal hernia	15	10	5	61 (41-75)
Wall hernia	5	3	2	58 (35-65)



**Figure 1:** A: Catheter with tunneller for intraoperative anesthesia infusion; B: Catheter with elastomer for postoperative infusion; C: Complete ON-Q Silversoaker® system; D: placement of the definitive system in inguinal hernia.



**Figure 2:** A: Introduction of the tunneller; B: Placement of the catheter in a subaponeuric situation; C: Vision of the catheter in its final position; D: Possibility of tunneling so that it does not migrate to a central position.

As for the local anesthetic, most can be used effectively, but those with long acting and lower toxicity are preferred, such as levobupivacaine, whose concentration must be 0.2-0.5% at a maximum dose of 200 mg and which has a duration of about 120-240 min. The patients were closely followed up with a telephone survey of pain at 24 hours and in person at 48 hours at the time of catheter removal. The evaluation of possible early mechanical complications was carried out by telephone follow-up and face-to-face evaluation at 48 hours. A follow-up visit was carried out 30 and 90 days after surgery to assess possible short- and medium-term complications of this postoperative analgesic modality.

### Statistical Analysis

The data has been collected by the same professional in a database in a protected format. Descriptive analysis is presented as mean and standard deviation for continuous variables such as age and as percentages for categorical variables such as the existence of complications.

### Results

We analyzed the results of postoperative pain at discharge, at 24 hours and 48 hours (at time the catheter was removed) with VAS of 0-1 in all the patients who were also discharged in less than 8 hours in an Ambulatory Surgery Program and did not require opioids for pain treatment Table 2. Neither infectious nor mechanical complications of the catheter were recorded in the early

evaluations or in the late 30- and 90-day postoperative evaluations, making home management of the system comfortable for patients. Only one patient had subcutaneous edema in the inguinal incision area that was completely resolved with conservative management (5% complications, group I in the Clavien-Dindo classification). This edema was manifested in the superficial and medial part of the skin incision.

**Table 2:** Postoperative pain evaluated at discharge from the CMA unit. \*VAS: Visual Analog Scale.

VAS	Hospital discharge	24H	48H
0	18	15	20
1	2	5	0

### Discussion

Therefore, it is a simple system, which minimizes the postoperative needs of oral analgesics, allows early ambulation of the patient and in some cases reduces hospital stay, allowing early discharge in surgery units without admission. The use of opioid drugs for the relief of postoperative pain that may be associated with adverse effects such as respiratory compromise, alterations in intestinal motility or the appearance of nausea and vomiting is reduced. Regarding its safety, various studies such as the one conducted by Lluís F, et al. [5] show that the use of this technique does not increase the risk of infection or other complications [6]. The possible expected complications are minor and can be

related, as in our case, with inhomogeneous administration of the anesthetic in an isolated area of the surgical wound, perhaps due to kinking or compression of the catheter during its travel. The use of "silversoaker" catheters, perforated for the anesthetic administration of the entire surgical bed and with silver impregnation to avoid possible bacterial infection associated with the use of an incisional catheter, appears to be a safe and effective technique for multimodal analgesia in Ambulatory Surgery Programs after surgical repair of abdominal wall defects [7-10].

## Acknowledgments

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## References

- López S (2011) Recomendaciones sobre el manejo del dolor agudo postoperatorio en cirugía ambulatorial 2: 21.
- Coley KC, Brian A Williams, Stacey V DaPos, Connie Chen, Randall B Smith (2002) Retrospective evaluation of unanticipated admissions and readmissions after same day surgery and associated costs. *J Clin Anesth* 14(5): 349-353.
- Fustran N, Dalmau Llitjós A, Sabaté Pes A (2011) Analgesia postoperatoria mediante infusión continua de anestésico local en la incisión quirúrgica tras cirugía abdominal. Revisión sistemática de la bibliografía. *Revista Española de Anestesiología y Reanimación* 58(6): 337-344.
- Levack ID, Holmes JD, Robertson GS (1986) Abdominal Wound Perfusion for the Relief of postoperative pain. *British Journal of Anaesthesia* 58(6): 615-619.
- Michael JS, Debra B Gordon, Teresa A Pellino, Trisha A Scanlon (2004) Continuous local anesthetic infusion for pain management after outpatient inguinal herniorrhaphy. *Surgery* 136(4): 761-769.
- Lluis F, Manuel Romero Simó, Juan Francisco Márquez, Juan Selva Otaolaurruchic, Antonio Zarco et al. (2011) Seguridad de un catéter multiperforado implantado en la herida quirúrgica para la infusiónn continua de anestésicos locales en la analgesia post-operatoria. *Cirugía Española* 89(9): 613-617.
- Spencer S Liu, Jeffrey MR, Richard CT, Christopher LW (2006) Efficacy of Continuous Wound Catheters Delivering Local Anesthetic for Postoperative Analgesia: A Quantitative and Qualitative Systematic Review of Randomized Controlled Trials. *American College of Surgeons* 203(6): 914-932.
- Baig MK, Oded Z, Jeannette D, Eric GW, Juan JN, et al. (2006) Use of the on-Q pain Management system is associated with decreased postoperative analgesic requirement double blind randomized placebo pilot study. *Journal of American College of Surgeons* 202(2): 297-305.
- Vintar N, Gorazd Pozlep, Narinder Rawal, Marija Godec, Slavko Rakovec (2002) Incisional self-administration of bupivacaine or ropivacaine provides effective analgesia after inguinal hernia repair. *Canadian Journal of Anesthesia* 49(5): 481-486.
- Rawal N, Axelsoon K, Hylander J, Allvin R, Amilon, et al. (1998) Postoperative pain-controlled local anesthetic administration at home. *Anesth Analg* 86(1): 86-89.



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