## Minilaparotomy

Traditional ventriculoperitoneal shunt surgery involves insertion of the distal peritoneal catheter by minilaparotomy. However, minilaparotomy may be a significant source of morbidity during shunt surgery. Laparoscopic insertion of the distal catheter is an alternative technique that may simplify and improve the safety of shunt surgery.

Laparoscopy-assisted insertion has become increasingly popular. It seems likely that use of an endoscope could lower the incidence of shunt malfunction. However, there is no consensus about the benefits of laparoscopy-assisted peritoneal catheter insertion.

A systematic search was performed using the PubMed, Embase, ScienceDirect, and Cochrane Library databases. A manual search for reference lists was conducted. The protocol was prepared according to the interventional systematic reviews of the Cochrane Handbook, and the article was written on the basis of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) guidelines.

Eleven observational trials and 2 randomized controlled trials were included. Seven operation-related outcome measures were analyzed, and 3 of these showed no difference between operative techniques. The results of the meta-analysis are as follows: in the laparoscopy group, the rate of distal shunt failure was lower (OR 0.41, 95% CI 0.25-0.67; p = 0.0003), the absolute effect is 7.11% for distal shunt failure, the number needed to treat is 14 (95% CI 8-23), operative time was shorter (mean difference [MD], -12.84; 95% CI -20.68 to -5.00; p = 0.001), and blood loss was less (MD -9.93, 95% CI -17.56 to -2.31; p = 0.01). In addition, a borderline statistically significant difference tending to laparoscopic technique was observed in terms of hospital stay (MD -1.77, 95% CI -3.67 to 0.13; p = 0.07).

To some extent, a laparoscopic insertion technique could yield a better prognosis, mainly because it is associated with a lower distal failure rate and shorter operative time, which would be clinically relevant <sup>1)</sup>.

## **Case series**

Open or laparoscopic distal catheter insertion was performed in 335 and 475 patients, respectively. There were no significant differences between the groups regarding age, race, ASA score, or indication for shunt placement. The most common indication was hydrocephalus due to subarachnoid hemorrhage, followed by tumor-associated hydrocephalus, normal pressure hydrocephalus (NPH), and hydrocephalus due to trauma. The incidence of shunt failure was not statistically different between cohorts, occurring in 20.0% of laparoscopic and 20.9% of open catheter placement cases (p = 0.791). With analysis of causes of shunt failure, shunt obstruction occurred significantly more often in the open surgery cohort (p = 0.012). In patients with a known cause shunt obstruction, distal obstruction occurred in 35.7% of the open cohort obstructions and 4.8% of the laparoscopic cohort obstructions (p = 0.014). The relative risk of distal obstruction in open cases compared with laparoscopic cases was 7.50. Infections occurred in 8.2% of laparoscopic cases compared with 6.6% of open cases (p = 0.419). Within the NPH subgroup, the laparoscopically treated patients had significantly more overdrainage (p = 0.040), whereas those in the open cohort experienced significantly more shunt obstructions (p = 0.034). Laparoscopically treated patients had shorter operative times (p < 0.0005), inpatient LOS (p < 0.001), and inpatient LOS after VP shunt placement (p = 0.01) as well as less blood loss (p = 0.058).

This is the largest reported comparison of distal VP shunt catheter insertion techniques. Compared with minilaparotomy, the laparoscopic approach was associated with decreased time in the operating room and a decreased LOS. Moreover, laparoscopy was associated with fewer distal shunt obstructions. Laparoscopic shunt surgery is a viable alternative to traditional shunt surgery <sup>2)</sup>.

## 1)

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Naftel RP, Argo JL, Shannon CN, Taylor TH, Tubbs RS, Clements RH, Harrigan MR. Laparoscopic versus open insertion of the peritoneal catheter in ventriculoperitoneal shunt placement: review of 810 consecutive cases. J Neurosurg. 2011 Jul;115(1):151-8. doi: 10.3171/2011.1.JNS101492. Epub 2011 Feb 11. PubMed PMID: 21314272.

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