Canadian Association Of Paediatric Surgeons

Evidence-Based Resource

Is Laparoscopic Or Open Pyloromyotomy The Better Method?

Evidence Level I

First described in 1990, laparoscopic pyloromyotomy (LP) has become an increasingly common approach to surgical treatment for hypertrophic pyloric stenosis, thanks to advancements in the technology and instrumentation. The purpose of this review was to determine whether LP is superior to the traditional open pyloromyotomy (OP). Due to an abundance of literature, we limited our search to systematic reviews (SRs) and randomized controlled trials (RCTs).

We identified four SRs (two including only RCTs (Oomen 2012, Jia 2011), one including only prospective trials (Sola 2009), and one included any comparitive trial designs (Hall 2004)) and five RCTs comparing LP and OP. Four of the RCTs were included in at least one of the included SRs (Hall 2009, Leclair 2007, St Peter 2006, Greason 1997) – the fifth was published after the SRs were conducted (Siddiqui 2012).

We pooled results from the included RCTs, in addition to supplemental data obtained through personal correspondence with the Hall (2009). The results of our meta-analyses revealed no significant differences in major perioperative complications (RD 0.03, 95% CI -0.03 to 0.08, P=0.35, I^2=55%), perioperative complications overall (RD -0.01, 95% CI -0.06 to 0.04, P=0.74, I^2=0%), operative time (MD 0.68, 95% CI -3.60 to 4.79, P=0.76, I^2=86%), or length of hospitalization (MD -2.60, 95% CI -6.05 to 0.86, P=0.14, I^2=0%) between LP and OP groups. LP was associated with a shorter time to achieve full feeds after surgery (SMD -0.25, 95% CI -0.43 to -0.06, P=0.009, I^2=8%), but a 4% higher rate of inadequate pyloromyotomy (RD 0.04, 95% CI 0.00 to 0.08, P=0.03, I^2=0%).

The identified SRs similarly did not find significant differences between the two procedures for the majority of outcomes based on their meta-analyses. Oomen (2012) found a small significant difference in time to full feeds favouring LP, Jia (2011) found a higher rate of inadequate pyloromyotomy in LP patients that bordered on significance, and Sola (2009) and Hall (2004) found shorter recovery times (time to full feeds and length of stay) following LP. Sola (2009) also found fewer overall complications associated with LP. Results from the additional RCT that was not included in these reviews revealed no differences in outcomes betreen LP and OP, except in terms of cosmesis, where LP was favoured (Siddiqui 2012).

In conclusion, LP may be somwhat superior to OP for hypertrophic pyloric stenosis in infants – based on shorter time to full feeds, hospital length of stay, and a similar complication rate between the two procedures – however the difference is not unequivocal. Additional large-scale well-designed RCTs are needed to elucidate the possible benefits of LP. For the time being, surgeons' preference and experience should determine the treatment decision.

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The full systematic review can be found here.

Systematic Reviews

Hall NJ, Van Der Zee J, Tan HL, Pierro A. Meta-analysis of laparoscopic versus open pyloromyotomy. Annals of Surgery 2004;240(5):774-8.

Jia WQ, Tian JH, Yang KH, Ma B, Liu YL, Zhang P, Li RJ, Jia RH. Open versus laparoscopic pyloromyotomy for pyloric stenosis: a meta-analysis of randomized controlled trials. European Journal of Pediatric Surgery 2011;21(2):77-81.

Oomen MW, Hoekstra LT, Bakx R, Ubbink DT, Heij HA. Open versus laparoscopic pyloromyotomy for hypertrophic pyloric stenosis: a systematic review and meta-analysis focusing on major complications. Surgical Endoscopy 2012;26(8):2104-10.

Sola, JE, Neville HL. Laparoscopic vs open pyloromyotomy: a systematic review and meta-analysis. Journal of Pediatric Surgery 2009;44(8):1631-7.

Randomized Controlled Trials

Greason KL, Allshouse MJ, Thompson WR, Rappold JF, Downey EC. A prospective, randomized evaluation of laparoscopic versus open pyloromyotomy in the treatment of infantile hypertrophic pyloric stenosis. Pediatric Endosurgery and Innovative Techniques 1997;1(3),175-9.

Hall NJ, Pacilli M, Eaton S, Reblock K, Gaines BA, Pastor A, Langer JC, Koivusalo AI, Pakarinen MP, Stroedter L, Beyerlein S, Haddad M, Clarke S, Ford H, Pierro A. Recovery after open versus laparoscopic pyloromyotomy for pyloric stenosis: a double-blind multicentre randomised controlled trial. Lancet 2009;373(9661),390-8.

Leclair MD, Plattner V, Mirallie E, Lejus C, Nguyen JM, Podevin G, Heloury Y. Laparoscopic pyloromyotomy for hypertrophic pyloric stenosis: a prospective, randomized controlled trial. Journal of Pediatric Surgery 2007;42(4),692-8.

Siddiqui S, Heidel RE, Angel CA, Kennedy AP Jr. Pyloromyotomy: randomized control trial of laparoscopic vs open technique. Journal of Pediatric Surgery 2012;47(1),93-8.

St Peter SD, Holcomb GW 3rd, Calkins CM, Murphy JP, Andrews WS, Sharp RJ, Snyder CL, Ostlie DJ. Open versus laparoscopic pyloromyotomy for pyloric stenosis: a prospective, randomized trial. Annals of Surgery 2006;244(3),363-70.

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