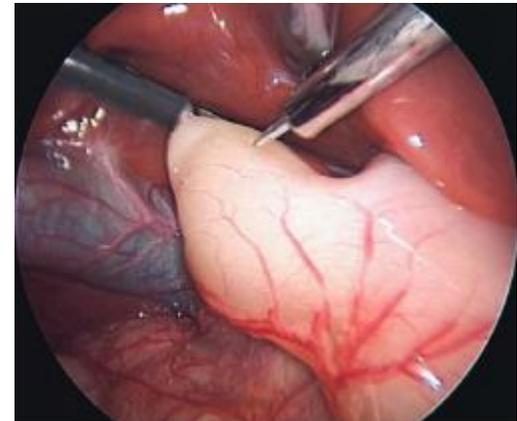


Comparison of laparoscopic and open pyloromyotomy

Fenne van den Bunder, Ernest van Heurn, Joep Derikx

Dept. Pediatric surgery, Emma Children's hospital, Amsterdam UMC.



QR-code





Infantile Hypertrophic Pyloric Stenosis

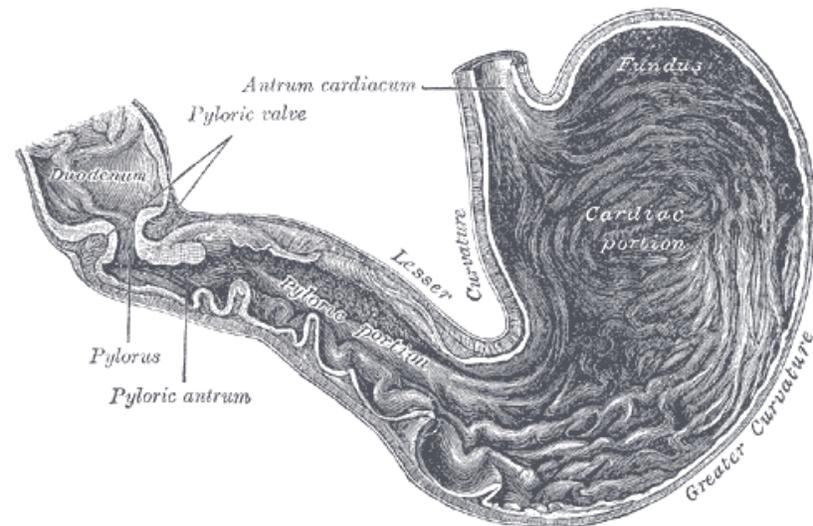


- Common surgical condition in infants (3-12 weeks)
- Incidence is 2-5 per 1000 live births (LB) in western countries. Recent study in NL: 1,3/1000 LB
- Exact pathophysiology unknown
- Gastric outlet obstruction causes projectile vomiting



Pyloromyotomy

- One of the most common surgical procedures performed in children
- Small laparotomy or laparoscopy
- No differences in complication rate





Laparotomy





Laparotomy

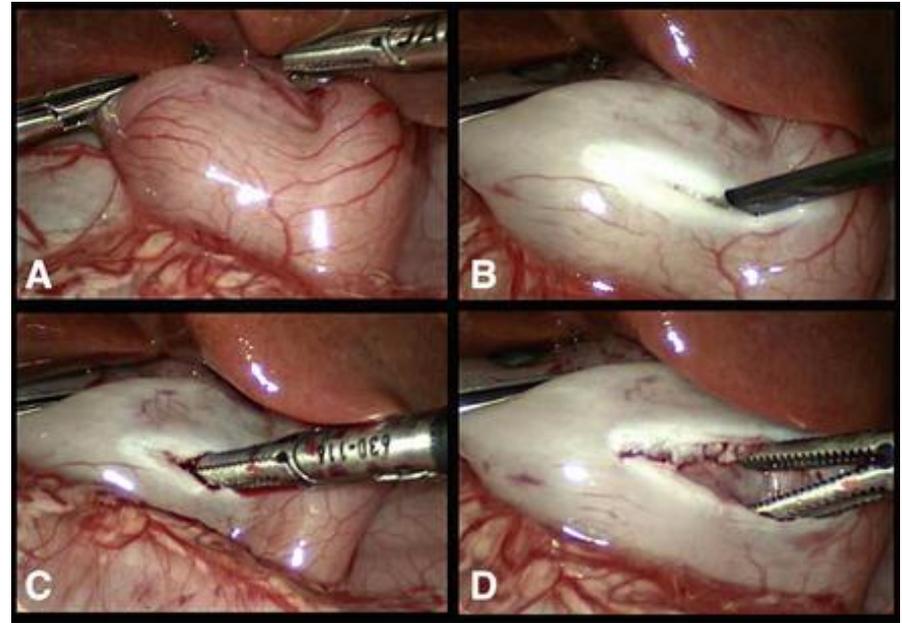
vs laparoscopy





Laparotomy

vs laparoscopy





Aim

- Study (severity of) complications after both approaches for pyloromyotomy.



Retrospective cohort study

- 2007-2017 in 2 pediatric surgical centers, Amsterdam
N= 474 patients (236 open vs. 238 lap)
- Severity: Clavien Dindo

Grades	Definitions of grades	Modes of therapy
Grade I	Any deviation from the normal postoperative course.	No pharmacological or surgical treatment, endoscopic or radiological interventions were required. Acceptable therapeutic regimens are drugs such as anti-emetics, antipyretics, analgesics, diuretics, and electrolytes and physiotherapy. Wound infections or small abscess requiring incision at bedside is within this category.
Grade II	Normal course altered	Pharmacological management other than in Grade 1. Blood transfusions and total parenteral nutrition are also included.
Grade III	Complications that require intervention of various degrees	Sub-classified into: Grade IIIa – complications that require an intervention performed under local anaesthesia. Grade IIIb – interventions that require general or epidural anaesthesia.
Grade IV	Complications threatening life of patients (including CNS complications), requiring ITU support	Further sub-classified into: Grade IV a – single organ dysfunction (including dialysis). Grade IV b – multi-organ dysfunction.
Grade V	Death of a patient	



Retrospective cohort study

- 2007-2017 in 2 pediatric surgical centers, Amsterdam
N= 474 patients (236 open vs. 238 lap)
- Severity: Clavien Dindo

Table 1. Baseline characteristics open vs lap

	Total	Open (N= 236)	Laparoscopic (N=238)	p-value
Sex (M/F)	401/73	195/41	206/32	0.24
Age (days)	33.0 [19]	32.5 [16]	35.0 [23]	0.28
Term/ preterm	422/48*	213/23	209/25	0.74
Birthweight (g)	3440.0 [738]*	3425.0 [720]	3457.5 [787]	0.84



Overall complication rate

- 83 complications in 71 patients (15.0%)
 - 26 peroperative vs. 57 postoperative
 - Clavien-Dindo grade I-IIIb

Nature of complications differs per approach

	Total (incidence %) (N= 474)	Open (N= 236)	Laparoscopic (N=238)	p-value
Complications recognized during surgery				
Intraoperative no signs of IHPS	5 (1.1)	-	-	-
Accidental mucosal perforation (stitched)	4 (0.8)	2	2	1.000
Serosal tears of the stomach	19 (4.0)	19	0	<0.001
Hemorrhage	1 (0.2)	0	1	1.000
Lesion of the skin	1 (0.2)	1	0	0.498
Lesion of the liver	1 (0.2)	0	1	1.000
Complications diagnosed after surgery				
Overlooked mucosal perforation (reoperation)	2 (0.4)	1	1	1.000
Fascial dehiscence	8 (1.7)	8	0	0.004
Omental herniation	6 (1.3)	0	6	0.030
Wound infection	21 (4.4)	14	7	0.114
Redo pyloromyotomy (incomplete/ recurrent)	4 (0.8)	1	3	0.623
Incisional hernia	10 (2.1)	4	6	0.751
Sepsis	3 (0.6)	2	1	0.623
Hemorrhage (reoperation)	1 (0.2)	0	1	1.000
Peritonitis	1 (0.2)	0	1	1.000
Subcutaneous hematoma	1 (0.2)	1	0	0.498

Nature of complications differs per approach

	Total (incidence %) (N= 474)	Open (N= 236)	Laparoscopic (N=238)	p-value
Complications recognized during surgery				
Intraoperative no signs of IHPS	5 (1.1)	-	-	-
Accidental mucosal perforation (stitched)	4 (0.8)	2	2	1.000
Serosal tears of the stomach	19 (4.0)	19	0	<0.001
Hemorrhage	1 (0.2)	0	1	1.000
Lesion of the skin	1 (0.2)	1	0	0.498
Lesion of the liver	1 (0.2)	0	1	1.000
Complications diagnosed after surgery				
Overlooked mucosal perforation (reoperation)	2 (0.4)	1	1	1.000
Fascial dehiscence	8 (1.7)	8	0	0.004
Omental herniation	6 (1.3)	0	6	0.030
Wound infection	21 (4.4)	14	7	0.114
Redo pyloromyotomy (incomplete/ recurrent)	4 (0.8)	1	3	0.623
Incisional hernia	10 (2.1)	4	6	0.751
Sepsis	3 (0.6)	2	1	0.623
Hemorrhage (reoperation)	1 (0.2)	0	1	1.000
Peritonitis	1 (0.2)	0	1	1.000
Subcutaneous hematoma	1 (0.2)	1	0	0.498

Nature of complications differs per approach

	Total (incidence %) (N= 474)	Open (N= 236)	Laparoscopic (N=238)	p-value
Complications recognized during surgery				
Intraoperative no signs of IHPS	5 (1.1)	-	-	-
Accidental mucosal perforation (stitched)	4 (0.8)	2	2	1.000
Serosal tears of the stomach	19 (4.0)	19	0	<0.001
Hemorrhage	1 (0.2)	0	1	1.000
Lesion of the skin	1 (0.2)	1	0	0.498
Lesion of the liver	1 (0.2)	0	1	1.000
Complications diagnosed after surgery				
Overlooked mucosal perforation (reoperation)	2 (0.4)	1	1	1.000
Fascial dehiscence	8 (1.7)	8	0	0.004
Omental herniation	6 (1.3)	0	6	0.030
Wound infection	21 (4.4)	14	7	0.114
Redo pyloromyotomy (incomplete/ recurrent)	4 (0.8)	1	3	0.623
Incisional hernia	10 (2.1)	4	6	0.751
Sepsis	3 (0.6)	2	1	0.623
Hemorrhage (reoperation)	1 (0.2)	0	1	1.000
Peritonitis	1 (0.2)	0	1	1.000
Subcutaneous hematoma	1 (0.2)	1	0	0.498



Severity of complications is comparable per approach

Table 3. Number of postoperative complications classified by the Clavien-Dindo classification

	Total	I		II		IIIa		IIIb	
		open	lap	open	lap	open	lap	open	lap
Mucosal perforation	2*	-	-	-	-	-	-	1	1
Fascial dehiscence	8	2	-	-	-	-	-	6	-
Omental herniation	6	-	-	-	-	-	3	-	3
Wound infection	21	9	5	5	2	-	-	-	-
Redo pyloromyotomy	4	-	-	-	-	-	-	2	2
Incisional hernia	10	4	6	-	-	-	-	-	-
Sepsis	3	-	-	2	1	-	-	-	-
Hemorrhage	1*	-	-	-	-	-	-	-	1
Peritonitis	1	-	-	-	1	-	-	-	-
Subcutaneous hematoma	1	1	-	-	-	-	-	-	-

* Complications which were recognized and treated sufficiently preoperative were excluded.



Omental herniation (OH)

- N=6 (2.5%), only after laparoscopic pyloromyotomy
- Rarely described
- Occurred at both sides of the abdomen and independent of closure of the fascia
- All infants required an intervention to reposition the omentum



OH at both sides of the abdomen and after closure of the fascia

Table 4. Patient characteristics of patients with OH					
Sex	Age (days)	Incisions	Closure of the incision after pyloromyotomy	Herniation	Treatment
♂	30	Stab incision in the right lower abdomen and left upper abdomen	All fascia defects are closed with knotted Vicryl sutures and subcutis of the umbilicus was approximated with Vicryl. Skin defects were closed with Steristrips.	Left upper abdomen	Reduction (twice) under local anesthesia and taped with Steristrips.
♀	29	Stab incision in the right lower abdomen and left upper abdomen	All fascia defects are closed with knotted Vicryl sutures and subcutis of the umbilicus was approximated with Vicryl. Skin defects were closed with Steristrips.	Left upper abdomen	Reduction and taped with Steristrips. Unknown whether local anesthesia was used.
♂	40	Insertion of a 3 mm trocar in the right hemi-abdomen and stab incision in the left hemi-abdomen	Infra umbilical fascia is closed with Vicryl sutures followed by intracutaneous closure with Monocryl. Other defects are closed with Steristrips.	Right hemi-abdomen	Resection and reduction of the herniated omentum under general anesthesia. Closure of the fascia with Vicryl sutures.
♂	52	Insertion of a 3 mm trocar in the right hemi-abdomen and stab incision in the left hemi-abdomen	Infra umbilical fascia is closed with Vicryl sutures followed by intracutaneous closure with Monocryl. Other defects are closed with Steristrips.	Right hemi-abdomen	Reduction under general anesthesia.
♂	34	Insertion of a 3 mm trocar in the right side and stab incision in epigastrio	Infra umbilical fascia is closed with Vicryl sutures followed by intracutaneous closure with Monocryl. Other defects are closed with Steristrips.	Right side	Reduction. Unknown whether local anesthesia was used.
	29	Stab incision in the right side and in the left upper abdomen.	All fascia defects are closed with Novosyn sutures. Skin defects are closed with Steristrips.	Left upper abdomen	Reduction under general anesthesia. Closure of the fascia with Novosyn sutures.



Trocar-site hernia as a typical postoperative complication of minimally invasive surgery among preschool children

K. Paya · J. Wurm · M. Fakhari · R. Felder-Puig ·
S. Puig

Surg Endosc (2008) 22:2724–2727

	293 LAPAROSCOPIC PROCEDURES	
Age	< 5y	> 5Y
N	3/53 (All 3 mm stab incisions)	0/240



Causes OH?

- Adhesion of omentum to instruments upon removal
- Poor muscle relaxation upon trocar removal
- No attention during desufflation
- Not closing the fascia
- Wound infection



Conclusion

- Overall complication rate of pyloromyotomy of 15.0%
- Serosal tear of the stomach and fascial dehiscence are only present after open pyloromyotomy
- Omental herniation is only present after laparoscopy and requires more attention
- How to close the fascia after stab wound?



Comparison of laparoscopic and open pyloromyotomy: Concerns for omental herniation at port sites after the laparoscopic approach

Fenne A. I. M. van den Bunder*, Ernest van Heurn & Joep P. M. Derikx

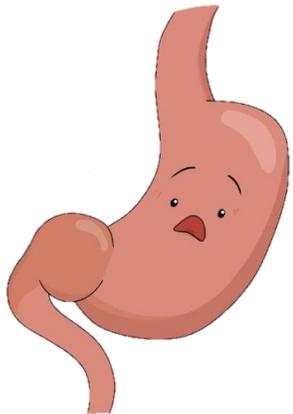
**SCIENTIFIC
REPORTS**

nature research

(2020) 10:363 | <https://doi.org/10.1038/s41598-019-57031-4>



Vielen Dank!



Joep P.M. Derikx | MD, PhD
Pediatric surgery, Emma Children's Hospital, Amsterdam UMC
Meibergdreef 9, 1100 DD Amsterdam
T: +31 20 566 5693 | Fax +31 20 566 9287
j.derikx@amsterdamumc.nl

