

Video-Assisted Transumbilical Appendectomy Compare to Laparoscopic and Open Appendectomy in Children

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ABSTRACT

Aim: Video-assisted transumbilical appendectomy (VATA) is a combination of laparoscopic appendectomy (LA) and open appendectomy (OA) that has the potential advantages of both techniques. In this study we report our recent experience with VATA and compare it to our experience with OA and LA.

Methods: The charts of all the children who underwent VATA between March 2006 and July 2008 were retrospectively reviewed and compared to those who had OA or LA between from July 2002 and October 2003 in our department. Children who present with a preoperative diagnosis of acute appendicitis and children who electively admitted for an interval appendectomy were candidates. One 12-mm trocar was inserted transumbilical. An operating laparoscope was used to mobilize the appendix, which was delivered through the umbilicus, and a standard extracorporeal appendectomy was performed. The results in VATA were compared to our results with OA and LA that was published in 2007.

Results: Of 129 children who underwent appendectomy, 58 had VATA, 52 OA and 19 LA. Of the 58 children who had VATA, 42 were performed for treating acute appendicitis and 16 as an interval appendectomy after conservative treatment of complicated appendicitis. The operating time was significantly longer for LA than for VATA and OA. The length of stay (LOS) was significantly shorter after VATA or LA than after OA. A lower percentage of children who underwent VATA needed MO than after LA and OA and children after VATA had to be statistically significant fewer days on NPO. There were no death or severe complications during or after any of the operations and there were no statistically significant differences regarding the complications between the groups.

Conclusions: Video-assisted transumbilical appendectomy is a safe, fast and inexpensive technique which combines the advantages of both OA and LA. The use of one trocar and extracorporeal Appendectomy make VATA, Less invasive, Easier, Faster and Cheaper.

Keywords: Video-Assisted, Laparoscopy, Appendectomy, Children, Complication, Coast

Introduction

Appendectomy is the most common emergency operation performed in children. Since its introduction by McBurney in 1894, Open Appendectomy (OA) has been the treatment of choice for acute appendicitis [1]. Laparoscopic Appendectomy (LA) was first described by Semm K. in 1983 [2]. During the last century LA has been found in numerous randomized trials to have a greater diagnostic accuracy, less post-operative pain, shorter hospital stay and to be as safe as OA in adult and children [3-15]. The main disadvantages of the LA are operating time that may be longer and that the equipment needs are higher, thus, increasing its cost [3,16]. Video-assisted transumbilical appendectomy (VATA) is a combination of LA and OA techniques that has the potential advantages of both techniques. Several recent studies have found many advantages to the VATA approach as compared

to the OA and LA for treating appendicitis [17-23]. The aim of this study is to evaluate our initial results with VATA comparing to our results with LA and OA [16].

Methods

After the institutional review board approval, the charts of all the children aged 0 to 14 years who underwent VATA from March 2006 to July 2008 were retrospectively reviewed and the results compared to the results of those who had OA or LA between July 2002 and October 2003 in our department. Children who present with a preoperative diagnosis of acute appendicitis and children who electively admitted for an interval appendectomy were candidates. Operating time (OT), morphine needs (MO), length of stay (LOS) and complications were analyzed.

One 12-mm trocar, one 10mm operating laparoscope, one grasper that should be long enough and a Babcock, those are the main instruments that we use for VATA. The trocar is openly inserted

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through a relatively wide incision in the umbilical ring into the abdomen. While the appendix base can reach the umbilical ring, its apex can be grasped and pull out through the trocar. In case the appendix is wider than the trocar, it should be taken out separately. A conventional extracorporeal appendectomy is done and the appendix base returned to its place. Re-exploration is done routinely to ensure haemostasis and irrigation is done only in selected cases. The umbilical ring is closed using absorbed suture while local anesthesia around and a glue above the incision, terminate the operation.

Statistical Methods: Continuous data were analyzed using ANOVA or the Kruskal-Wallis test in the case of non-normally distributed data. Categorical data were analyzed using Chi-square tests. Fisher exact p values were computed where warranted. Comparison of two groups continuous data were analyzed by independent t tests or Wilcoxon two independent sample tests.

Results

Of 129 children who underwent appendectomy, 58 had VATA, 52 OA and 19 LA. During VATA an additional trocar was placed in 3(5%) children and in 7(12%) children VATA was converted to OA. There were no statistically significant differences regarding the grade of the inflammatory process of the appendix between the groups. In 8 (6.2%) the pathologic assessment failed to demonstrate appendicitis, 80 (62%) children had acute non-perforate appendicitis, 24 (18.6%) had perforated appendicitis, 2 (1.6%) had a periappendicular abscess and 16 (12.4%) children underwent interval appendectomy (Table 1).

Table 1: Operative Description of Appendices

Appendix	VATA N (%)	OA N (%)	LA N (%)	Total N (%)
Normal	2 (3.4)	2 (3.8)	0 (0.0)	8 (6.2)
Inflamed	23 (39.7)	32 (61.5)	13 (68.4)	66 (51.2)
Gangrenous	8 (13.8)	5 (9.6)	2 (10.5)	14 (10.8)
Perforated	9 (15.5)	10 (19.2)	4 (21.1)	24 (18.6)
Abscess	0 (0.0)	3 (5.7)	0 (0.0)	2 (1.6)
Other	16 (27.6)	0 (0.0)	0 (0.0)	16 (12.4)
Total	58 (100)	52 (100)	19 (100)	129 (100)

There were no statistically significant differences regarding weight and sex between the children in the different groups. Children who underwent VATA were significantly older than those who underwent LA, (p< 0.02) and adjustment for age did not change the results significantly (Table 2).

Table 2: Demographic data by operating type (Mean ± SD)

Variable	VATA	OA	LA	P VATA vs. OA	P VATA vs. LA	P OA vs. LA
Age (Y)	11.0± 2.7	9.6± 2.6	8.6± 3.4	.06	.02	.28
Male (%)	16 (57.1)	25 (67.6)	9 (60.0)	.44	1.00	.75
Weight (Kg)	38.2± 11.5	32.7± 11.7	32.0± 8.5	.07	.113	.86

There were no statistically significant differences regarding the temperature and the WBC count on admission between the groups (Table 3). The operating time was significantly longer for LA than for VATA or OA (p<0.001 and p<0.03 respectively).

The length of stay (LOS) was significantly shorter after VATA or LA than after OA (p<0.001 and p<0.007 respectively). Children who underwent OA were on IV hydration more days than after LA or VATA (p<.0001). A lower percentage of children who underwent VATA had MO than after LA and OA. After VATA children had to be statistically significant fewer days on NPO than after OA (Table 3).

Table 3: Clinical data by operating type (Mean±SD)

Variable	VATA	OA	LA	P VATA vs. OA	P VATA vs. LA	P OA vs. LA
Temp. (C)	37.2± 0.7	37.4± 0.6	37.6± 0.8	.23	.09	.32
WBC	15.8± 5.7	17.4± 5.3	16.0± 5.5	.26	.92	.40
OR Time (Min)	45± 12	38± 43	65± 13	.42	.0001	.03
LOS (days)	2.8± 1.2	4.3± 2.0	2.9± 1.9	.001	.59	.007
IV Hydration (Days)	1.4± 0.6	2.3± 0.8	1.7± 0.7	.0001	.15	.02
MO (%)	50.0	81.1	93.3	.02	.006	.41
NPO (Days)	1.0± 0.2	2.1± 0.7	1.7± 0.8	.02	.46	.20

There were no death or severe complications during or after any of the operations and there were no statistically significant differences regarding complications between the groups. After VATA tow children had wound infection and three had partial bowel obstruction that was treated conservatively. After LA one child developed intra abdominal abscess and need reoperation for drainage and tow had wound infection. After OA one child developed intra abdominal abscess, one child had Partial Bowel obstruction that was treated conservatively and three had wound infection.

Discussion

The advantages of LA over OA are better diagnostic accuracy and less invasiveness what make the recovery after LA easier and faster with less need for MO, shorter time on NPO and shorter LOS. The disadvantages of LA are the possible longer operating time, more expensive equipments and more skill required from the surgeon and the team. In our initial experience VATA was found to be as safe as LA and OA. An additional trocar was placed in 3(5%) children and in 7(12%) children VATA was converted to OA. The use of one trocar and extracorporeal Appendectomy make VATA, Less invasive, Easier, Faster and Cheaper having all the LA advantages without any of its disadvantages. We conclude that VATA can be safely recommended for treating all children with appendicitis.

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