DOI: 10.23934/2223-9022-2018-7-2-129-133

A NEW METHOD OF TREATMENT FOR APPENDICEAL STUMP

A.L. Charyshkin, M.M. Yartsev*

Department of Faculty Surgery
FSBEI HE "Ulyanovsk State University"
ulitsa Lva Tolstogo, 42, Ulyanovsk 432017, Russian Federation

*** Contacts:** Maksim M. Yartsev, post-graduate student of the Department of Faculty Surgery, FSBEI HE "Ulyanovsk State University". Email: max.ul2008@rambler.ru

BACKGROUND In 30% of acute destructive appendicitis, the disease is accompanied by typhlitis, which makes it difficult to perform classical methods of appendiceal stump treatment.

AIM OF STUDY To improve the way of appendiceal stump treatment in the destructive form of acute appendicitis complicated by significant typhlitis.

MATERIAL AND METHODS We studied 57 cases of acute destructive appendicitis complicated by typhlitis, which were divided into two groups depending on the method of treatment. The first group (comparison group) consisted of 30 patients who underwent a standard method for treating the appendiceal stump after appendectomy, such as ligation at the base and putting the stump into the cupula of the cecum and fixing it with interrupted serous-muscular sutures or with a purse and Z-shaped sutures. The second (main) group included 27 patients, who were treated by the method we proposed. The essence of the method is successive U-shaped stitching of the stump. After that, the stump curls in the form of a cochlea, peritonizes, reaching the necessary tightness without going into the cupula of the cecum. In this case, the abdominal cavity of patients in both groups was adequately sanitized and drained.

RESULTS In the first group of patients there were technical difficulties associated with immersion of the appendiceal stump, which caused the serous damage, hematoma of the cupula of the cecum in 7 (23.3%) patients. In the second group of patients, due to the developed method of forming the appendiceal stump, technical difficulties did not arise, there were no complications.

The duration of appendectomy in the first group of patients with standart treatment (interrupted serous-muscular sutures or purse and Z-shaped stiches) was 28.7±5.4 minutes, and in the second group of patients appendectomy with stump management with the suggested method lasted 20.3±6.1 minutes, $p < 0.05$, which reduced the operation time by 8 minutes on the average.

Purulent-inflammatory wound complications in the first group were detected in 7 patients (23.3%), and in 1 (3.7%) patient of the second group, which is significantly less by 19.6%.

CONCLUSION The proposed method is technically simple, as peritonization of the stump is performed without putting it into the cupula of the cecum. The use of this method is indicated in destructive forms of acute appendicitis complicated by severe typhlitis, which significantly reduces the operation trauma and contributes to reduction in the number of postoperative wound purulent-inflammatory complications by 19.6%.

FINDINGS The proposed method for treating the appendiceal stump during appendectomy for acute destructive appendicitis complicated by typhlitis is simple enough, reliable, characterized by low traumatism and shortens the duration of surgery by 8 minutes on the average ($p < 0.05$).

Keywords: destructive appendicitis, typhlitis, appendectomy, appendiceal stump

For citation Charyshkin A.L., Yartsev M.M. A new method of treatment for appendiceal stump. *Russian Sklifosovsky Journal of Emergency Medical Care.* 2018; 7(2): 129–133. DOI: 10.23934/2223-9022-2018-7-2-129-133 (In Russian)

Conflict of interest Authors declare lack of the conflicts of interests

Acknowledgments The work was carried out in accordance with the plan of scientific research of Ulyanovsk State University. This study was carried out with the financial support of the Ministry of Education and Science of the Russian Federation as a part of the state support for the scientific project No. 18.7236.2017/BCh

ORCID of authors

A.L. Charyshkin: 0000-0003-3978-1847

M.M. Yartsev: 0000-0003-1570-8856

INTRODUCTION

According to the literature [1-4], in patients with acute destructive appendicitis, the course of the disease is complicated with typhlitis in 1.5 to 30% of observations, which makes it difficult to perform the management of the appendiceal stump. Due to inflammation, the wall of the cecum with typhlitis becomes rigid, so the buried sutures [5-8] just cut the wall. Despite technical difficulties with the stump buried into the wall of the cecum with typhlitis, these techniques are used most often [8-11]. In case of significant inflammatory changes in the cupula of the cecum in patients with acute appendicitis, the appendiceal stump dehiscence is 0.37%, which complicates the course of the postoperative period with intestinal fistula, abscess, peritonitis and adhesions [12, 13]. In elderly and senile patients, due to the high pain threshold, a decrease in immune reactivity, the presence of atherosclerosis and trophic disorders, destructive acute appendicitis and typhlitis often develop [1, 12, 13].

In the available literature, a method for the formation of the appendiceal stump by Seeling-Kimbarovsky is described. After appendectomy, the the stump is ligated, treated with an antiseptic and, without covering the peritoneum, is left in the abdominal cavity [8, 11, 13]. This method is simple, but has contraindications for destructive inflammation at the base of the appendix and the cupula of the cecum [8, 11, 13].

Given the above, it is necessary to improve the method of appendectomy in patients with destructive appendicitis complicated by typhlitis.

The aim of study is to improve the way of management for the stump of the appendix in the destructive forms of acute appendicitis, complicated by typhlitis.

Objectives. To develop a method of managing the stump of the appendix in the destructive forms of acute appendicitis, complicated by typhlitis. Compare the immediate results of appendectomy, depending on the method of treatment of the stump of the appendix.

MATERIAL AND METHODS

The study was performed at the Department of Faculty Surgery of the State Pedagogic University of Ulyanovsk, at the bases of surgical departments of the State Unitary Enterprise Ulyanovsk Regional Clinical Center for Specialized Medical Care, the surgical department of the CRH of Nikolaiyevka. We examined medical records of 57 patients with destructive appendicitis, complicated by typhlitis, treated in 2008-2017.

All patients are divided into 2 groups, depending on the method of treatment. The first group (comparison) consisted of 30 patients who, after appendectomy, underwent a standard method for burying the stump, ligating it at the base and putting it into the cupula of the cecum with interrupted serous-muscle sutures or with the purse suture and *Z*-shaped sutures. The second (main) group included 27 patients, whose treatment of the stump of the appendix after appendectomy was performed by the method we present (patent No. 26129 84) [14]. The distribution of patients in groups by pathomorphological forms of acute appendicitis is presented in Table 1.

Table 1

Distribution of patients in groups according to pathomorphological forms of acute destructive appendicitis

Pathomorphological form	1st group, comparisons (*n*=30)	2nd group, main (*n*=27)
Phlegmonous	21 (70%)	19 (70.4%)
Gangrenous	9 (30%)	8 (29.6%)

As follows from Table 1, both groups of patients are comparable in pathomorphological forms of acute appendicitis.

The work was carried out with the informed consent of the patients and the permission of the Ethical Committee of the Institute of Medicine of Ecology and Physical Culture of Ulyanovsk State University in accordance with the legislation of the Russian Federation and the Helsinki Declaration of 1975.

Standard methods of investigation (clinical, laboratory, X-ray, endoscopic, ultrasound, histological) were used.

All patients underwent appendectomy from the *McBurney* site via mini-access of 3-5 cm with the use of the original retractor (A.L. Charyshkin, RF patent No. 35704) [15]. Patients in both groups were comparable by gender and age, the mean age was 38.9±14.3 years. There were 12 patients (over 60 years) of elderly age (21.1 %), all patients in this age group had a gangrenous pathomorphic form of acute appendicitis (Table 2).

Table 2

Patients distribution by age

Age, years	1st group, *n*=30	2nd group, *n*=27
18-39	17 (56.7%)	15 (55.6%)
40-59	7 (23 , 3%)	6 (22.2%)
60-74	6 (20%)	6 (22.2%)

When performing the operation, a resorbable synthetic suture material and atraumatic needles were used. In this case, patients in both groups were adequately sanitized and the abdominal cavity was drained.

The method is carried out as follows. They make an access to the appendix. After cutting off the appendix, the ligature 1 (Fig. 1) is performed when the needle goes into along the upper edge of the stump of the appendix 2 from the mesenteric side, and then goes out from the opposite mesenteric side of the upper edge of the stump 2, then then goes into on the opposite mesenterial side of the upper edge of the stump 2, having retreated from the edge 2 - 3 mm, and then the needle goes out along the upper edge of the stump 2 from the mesenteric side.

When pulling over the ends of the thread 1 towards the cupula 3 of the cecum (downwards), the stump 2 of the appendix is folded in half (Fig. 2), the top edge down to its base.

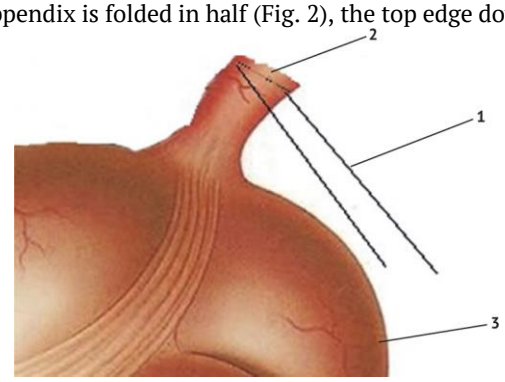

Fig. 1. The stage of appendiceal stump management. U-shaped ligation along the upper edge of appendiceal stump. 1 — the suture; 2 — the appendiceal stump; 3 — the cupula of the cecum

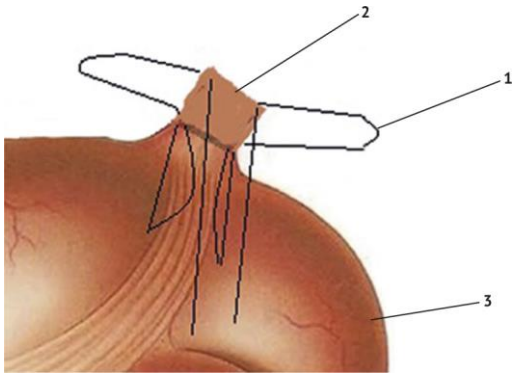

Fig. 2. The stage of appendiceal stump management. The stump of the appendix is folded in half, the upper edge down to the base, the suture is performed through the base of the stump. 1 — the suture; 2 — the appendiceal stump; 3 — the cupula of the cecum

Next, the ends of the thread 1 are alternately turned to the opposite side by inserting a needle through the base of the stump 2 on the right and left, deviating from the edge of each side by 2-3 mm. Further, the ends of ligature 1 are alternately held on the mesenteric side by putting a needle through the middle of the stump 2 on the opposite mesenteric side to the right and to the left, deviating from the edge of each side by 2-3 mm.

Then, when pulling the ends of ligature 1 toward the cupula 3 of the cecum (downwards), the stump 2 is folded once more (Fig. 3). The ends of the ligature 1 are alternately put on the opposite side by inserting the needle through the base of the stump 2 on the right and left, deviating from the edge of each side by 2-3 mm, the ends of ligature 1 are tied at the base of the stump 2 on the opposite mesenteric side.

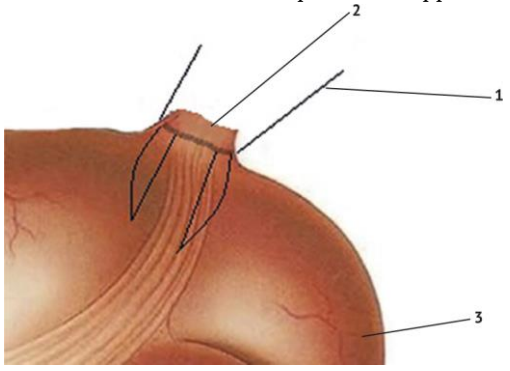

Fig. 3. The stage of appendiceal stump management. The appendiceal stump is folded once more in half, the suture id performed through the base of the stump. 1 — the suture; 2 — the appendiceal stump; 3 — the cupula of the cecum

In this way, a consecutive U-shaped suturing of the appendiceal stump is performed, then the stump curls like a cochlea and become peritonized, reaching the necessary tightness.

In the statistical processing of the results of the study, the arithmetic mean M, the deviation of the mean σ, the Student's test (t) were determined . The average statistical indicators are given as $M \pm \sigma$. Differences in the values of indicators were considered significant with a confidence level of 0.95 or more ($p \leqslant 0.05$).

RESULTS

In the first group of patients (comparison group), technical difficulties arose due to burying the stump into the cupula of the cecum, which caused deserosation, hematoma of the cupula of the cecum in 7 patients (23.3%). In the second (main) group of patients, due to the developed method of forming the stump, there were neither technical complications, nor clinical complications.

The duration of surgical interventions in the allocated groups has statistically significant differences. The appendectomy in the first group of patients lasted on average 28.7±5.4 minutes, and in the second group with suggested method it lasted to be statistically significantly less, 20.3 ± 6.1 minutes on average, $p<0.05$, which reduces the duration of the operation by an average of 8 min.

Purulent-inflammatory wound complications in the first group were detected in 7 patients (23.3%), and in 1 (3.7%) patient of the second group, which statistically significantly less by 19.6%, or 6.3 times.

Clinical example

A 36-year-old male patient I., admitted with a diagnosis of acute appendicitis.

Upon admission, the patient complained of pain in the right side and in the lower abdomen, nausea. Sick for 8 hours.

Examination: general condition of moderate severity; moist and pale skin; pulse of poor volume and tension 100 bpm; blood pressure 120/60 mm Hg.

The tongue is dry, covered with white coat. The abdomen is of regular shape, not bloated, symmetrical, involved unevenly in the act of breathing, with the failure of the right half. Upon palpation, the abdomen is tense and sharply painful in the projection of the right ileal fossa. Hepatic dullness is preserved. Intestinal peristalsis is preserved. The

symptom of Shchetkin-Blumberg is negative.

The diagnosis is "Acute appendicitis".

Operation. Appendectomy, sanation and drainage of the abdominal cavity were performed. An incision of skin and subcutaneous tissue 4 cm long at the *McBurney* point was made, the muscles were dilated in an obtuse way, then the peritoneum was opened. During the exploration, a strained, hyperemic, fibrin-covered appendix of 9.0x2.0 cm, located in the right ileal fossa was revealed; the cupula of the caecum was swollen, hyperemic, covered with fibrin. Considering the possible occurrence of technical difficulties due to the significant inflammation of the cupula of the cecum (typhlitis), namely, cutting the tissue with stitches when burying the stump into the cupula, the stump was managed with the suggested method after appendectomy, and the abdominal cavity was sanitized and drained.

The postoperative period was uneventful. On day 6 after the surgery, the patient was discharged from the hospital under in a satisfactory condition under the supervision of a surgeon in a polyclinic at the place of residence.

There were no complaints upon examination 6 months later. The operation is considered to be good.

CONCLUSION

The proposed method is technically simple, as peritonization of the stump of the appendix is performed without its burying in the cupula of the cecum. The use of this method is shown in the destructive forms of acute appendicitis, complicated by severe typhlitis, which significantly reduces the surgery trauma and results in reduction of postoperative wound pyoinflammatory complications by 19.6%.

This study was carried out with the financial support of the Ministry of Education and Science of the Russian Federation in the framework of the state support of the scientific project No. 18.7236.2017/BCh.

REFERENCES

1. Aliyev S.A., Aliyev E.S. Evolution of the methods of peritonization of the vermiform process stump in acute destructive appendicitis complicated by typhlitis. *Vestnik khirurgii imeni II Grekova*. 2006; 165(1): 67–72. (In Russian).
2. Bezrodnyy B.G., Kolosovich I.V., Iovitsa A.V., et al. Rational antibacterial therapy at surgical treatment of patients with destructive forms of acute appendicitis. *Khirurgiya Vostochnaya Evropa*. 2013; (1): 31–36. (In Russian).
3. Kozulina N.V., Parshikov V.V., Biryukov YU.P. Clinical aspects of acute appendicitis and appendicular peritonitis at children. *Meditsina i obrazovaniye v Sibiri*. 2014; (3): 53. (In Russian).
4. Kostenko N.V., Razuvaylova A.G. The contemporary problems of diagnostics and treatment of appendicitis and its complications. *Astrakhanskiy meditsinskiy zhurnal*. 2014; 9(2): 8–14. (In Russian).
5. Panin A.V., Dubrovskiy A.V., Petrov D.YU., et al. The results of open and laparoscopic appendectomy in pregnant women with acute appendicitis. *Khirurgiya Zhurnal imeni NI Pirogova*. 2016; (4): 21–25. (In Russian).
6. Razumovskiy A.YU., Dronov A.F., Smirnov A.N., et al. Acute appendicitis in children. *Rossiyskiy vestnik detskoy khirurgii, anesteziologii i reanimatologii*. 2013; 3(4): 125–132. (In Russian).
7. Styazhkina S.N., Salavatullin A.V., Kuznetsov S.F., Aleksandrov A.YU. Problematic issues of surgical treatment of acute appendicitis and its complications. *Sovremennyye tendentsii razvitiya nauki i tekhnologiy*. 2016; (3–2): 55–57. (In Russian).
8. Timerbulatov V.M., Timerbulatov M.V. Discussion about therapeutic tactics in case of acute appendicitis. *Khirurgiya Zhurnal imeni NI Pirogova*. 2014; (4): 20–22. (In Russian).
9. Fomin S.A. *Diagnosis and treatment of acute appendicitis*. Yaroslavl', 2010. 123 p. (In Russian).
10. Abbasi N., Patenaude V., Abenhaim H.A. Evaluation of obstetrical and fetal outcomes in pregnancies complicated by acute appendicitis. *Arch Gynecol Obstet*. 2014; 290(4): 661–667. PMID: 24838290. DOI: 10.1007/s00404-014-3276-7.
11. Abbasi N., Patenaude V., Abenhaim H.A. Management and outcomes of acute appendicitis in pregnancy-population-based study of over 7000 cases. *BJOG*. 2014; 121(12): 1509–1514. PMID: 24674238. DOI: 10.1111/1471-0528.12736
12. Charyshkin A.L., Yakovlev S.A., Demin V.P. Preperitoneal blockade in the treatment of patients with perforated gastroduodenal ulcers and peritonitis. *Int J Biomed*. 2016; 6(2): 114–118. DOI: 10.21103/Article6(2)_OA4.
13. Wilasrusmee C., Sukrat B., Mc Evoy M., et al. Systematic review and meta-analysis of safety of laparoscopic versus open appendectomy for suspected appendicitis in pregnancy. *Br J Surg* 2012; 99(11): 1470–1478. PMID: 23001791. PMCID: PMC3494303. DOI: 10.1002/bjs.8889.
14. Charyshkin A. L., Yartsev M. M. *Method of processing the stump of the worm-like process in appendectomy*. Patent RF No. 2612984. Decl. 11.05.2016; publ. 14.03.2017. Bul. No. 8. (In Russian).
15. Charyshkin A.L., Bikbayeva K.I. Comparative results of application of the minilaparotomy at patients with sharp cholecystitis. *Sovremennyye problemy nauki i obrazovaniya*. 2014; (2): 282. (In Russian).

Received on 12.02.2018

Accepted on 02.04.2018