



Case report

Stump appendicitis after laparoscopic appendectomy; laparoscopic management and literature review

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ABSTRACT

Introduction: Appendectomy is one of the most common surgical procedures performed worldwide. There are different etiologies for acute appendicitis such as obstruction of the appendiceal lumen by fecalith, lymphoid hyperplasia, or neoplasm.

Laparoscopic appendectomy has become the treatment of choice for both complicated and uncomplicated appendicitis; common postoperative complications include wound infection, bleeding, intraabdominal abscess. Stump appendicitis is defined as the interval repeated inflammation of remaining residual appendiceal tissue after an appendectomy.

Presentation of case: 38-Year-old female patient with a history of laparoscopic appendectomy performed in 2016 for acute uncomplicated appendicitis.

She arrived to the emergency room due to abdominal pain 7 out of 10, located in the periumbilical region, later with migration to the right lower quadrant, abdominal CT scan evidenced the presence of a cecal and pericecal inflammatory process as well as the base and residual proximal portion of the cecal appendix laparoscopic stump appendectomy was performed.

Discussion: Stump appendicitis (SA) is defined as the inflammation of the remnant of the cecal appendix after an appendectomy, whether due to impaction of a fecalith or secondary to an ischemic process, the probability of developing SA is estimated to be about 1/50,000 cases throughout life.

The most frequently used treatment is exploratory laparotomy to complete the previous appendectomy; however, there are 5 reported cases of stump appendicitis, where surgical resolution was performed through laparoscopic surgery.

Conclusions: It is important to keep this entity in mind when evaluating a patient with acute abdomen with previous history of appendectomy, since the delay in diagnosis and treatment increases morbidity and mortality; laparoscopic stump appendectomy has been shown to be a safe treatment (Agha et al., 2020 [14]).¹

1. Introduction

Appendectomy is one of the most common surgical procedures performed worldwide; with the advancements of minimally invasive surgery laparoscopic appendectomy has become the standard of care for patients with acute appendicitis [1]. There are different etiologies for acute appendicitis such as obstruction of the appendiceal lumen by fecalith, lymphoid hyperplasia, or neoplasm. Common pathophysiology shows progressive appendiceal luminal distention with compromise of the lymphatic and vascular circulation, resulting in appendiceal wall

hypoxia followed by consequent bacterial translocation, and perforation if medical/surgical treatment is not sought [2]. Laparoscopic appendectomy has become the treatment of choice for both complicated and uncomplicated appendicitis; common postoperative complications include wound infection, bleeding, intraabdominal abscess.

Stump appendicitis (SA) is defined as the interval repeated inflammation of remaining residual appendiceal tissue after an appendectomy [4].

Stump appendicitis is a rare complication following appendectomy; incomplete resection of the appendiceal base leaves a stump behind,

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¹ The work has been reported in line with the SCARE 2020 criteria.



Figs. 1 & 2. CT of the abdomen showing a 14.25 mm appendicular stump, with wall edema, fat striation and increased in diameter.

which allows for recurrent appendicitis, residual appendiceal tissue left at the time of appendectomy is thought to be the cause [3].

Being a rare complication with few case reports reported throughout the medical literature, stump appendicitis must be a differential diagnosis for patients with acute abdomen after previous appendectomy. Having this diagnosis in mind can prevent delays in treatment and subsequently an increase in morbidity [5,14].

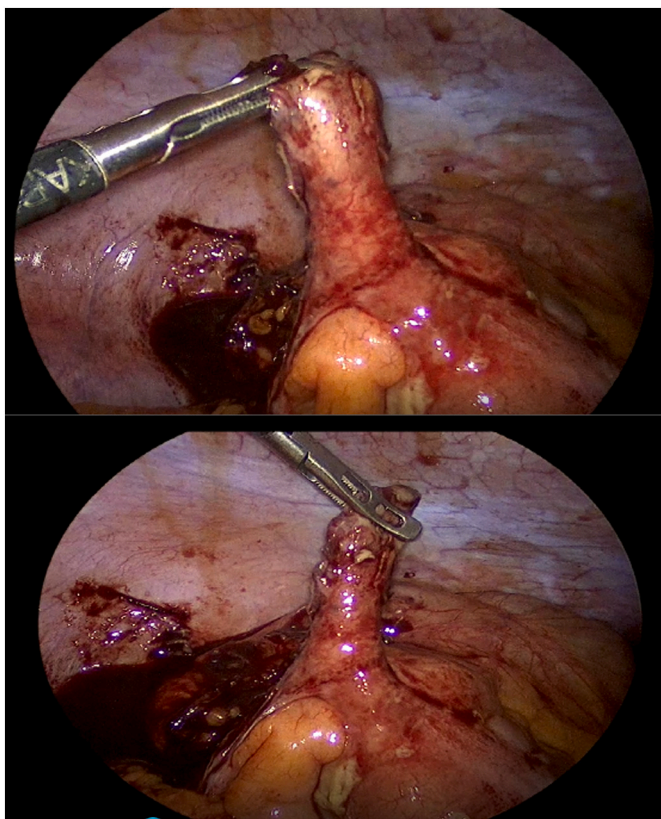
2. Presentation of case

This is a 38-year-old female patient with a history of laparoscopic appendectomy performed in 2016 for acute uncomplicated appendicitis; her past medical history was of no relevance. She arrived at the emergency room due to abdominal pain 7 out of 10 located in the periumbilical region, later with migration to the right lower quadrant; the pain was accompanied by hyporexia, nausea without reaching vomiting, fever quantified at 38 °C. On physical examination her vitals were within normal limits except for tachycardia, abdominal examination revealed pain on palpation in the right lower quadrant, Mc Burney sign

was present, rebound tenderness present, with signs of local peritoneal irritation, normoactive peristalsis. Laboratory studies were sent showing mild leukocytosis with left shift. It was decided to carry out an abdominal CT scan which evidenced the presence of a cecal and pericecal inflammatory process as well as the base and residual proximal portion of the cecal appendix (Figs. 1–2). Laparoscopic stump appendectomy was decided, finding scant free fluid in the cavity, an exploration was carried out towards the ileocecal valve, and an appendicular stump with inflammatory characteristics was identified (Figs. 3–4). A dissection is performed and the appendicular stump was resected with a linear stapler (Fig. 5); final histopathology reports showed the presence of acute stump appendicitis. The post-operative period was uneventful; the patient was discharged 48 h later without complications.

3. Discussion

The usual measurements of the cecal appendix are usually extremely variable, although on average they range between 6 and 12 cm in length; the usual location of the appendix is 2.5 cm from the ileocecal valve



Figs. 3 & 4. Intraoperative view showing appendicular stump with evidence of inflammation without perforation.

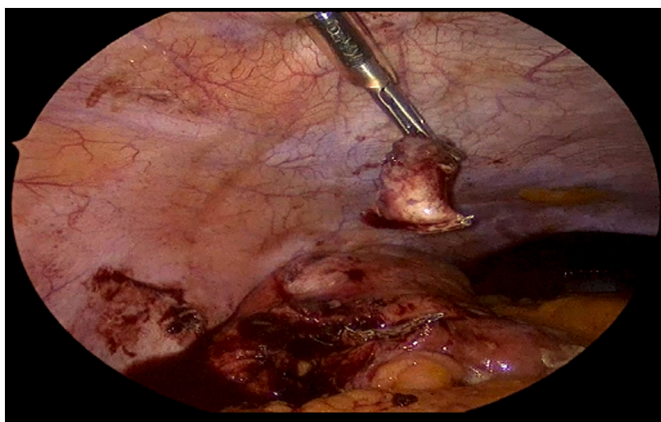


Fig. 5. Stapled stump appendicular resection.

finding its base at the convergence of the taenia with a variable locations of tip [6].

Stump appendicitis (SA) is defined as the inflammation of the remnant of the cecal appendix after an appendectomy, whether due to impaction of a fecalith or secondary to an ischemic process, the probability of developing SA is estimated to be about 1/50,000 cases throughout life [7].

It is established in the literature that a risk factor for stump appendicitis is the length of the appendix remnant after surgery, recommending that the stump be less than 5 mm [8]. Although the length of the stump is not definitive to avoid presenting this entity, it has been shown to decrease its incidence.

To be able to follow this recommendation, it is essential to identify

the appendicular base with total certainty; to be able to achieve this, it is recommended to locate the taenia coli of the cecum and follow them until their convergence [9]; there are occasions in which the dissection of the base is extremely difficult due to the presence of an important inflammatory process, the location of the appendix base or the presence of its veils (Jackson/Lane), making hard to identify the base, conditioning the risk of later presenting SA [10].

The clinical picture of SA is the same as that found in a picture of acute appendicitis, however, due to the past surgical history of appendectomy, a delay in diagnosis is very frequent situation that leads to an increase in morbidity such as necrosis of the stump or cecum leading to perforation and subsequent peritonitis [11].

The most important step in making the diagnosis is to have a high index of suspicion since usually patients will present with the characteristic clinical findings of a picture of appendicular inflammation. Laboratory studies, as well as clinical findings, will be similar to those of acute appendicitis, so diagnostic imaging methods play a fundamental role when making the diagnosis, with computerized tomography being the gold standard [12].

The most frequently used treatment is exploratory laparotomy to complete the previous appendectomy; however, there are 5 reported cases of stump appendicitis, where surgical resolution was performed through laparoscopic surgery, of 36 cases described in the literature, 4 required hemicolectomy, due to perforation with involvement of the cecum. The length of stay after surgery was between 8 and 9 days [13].

4. Conclusions

Stump appendicitis is an unusual complication with few case reports that occurs after an appendectomy; it is important to keep this entity in mind when evaluating a patient with acute abdomen with previous history of appendectomy, since the delay in diagnosis and treatment increases morbidity and mortality. Laparoscopic stump appendectomy has been shown to be a safe treatment.

Ethical approval

There was no need for ethical approval.

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CRediT authorship contribution statement

Alberto; Valdes Castañeda MD FACS: Study design Juan Pablo; Arribas Martin MD: Study design Carlos; Mancera Steiner MD: Study design Raul Alexander; Cuevas Bustos MD: Data collection, data analysis Luis Miguel Zamora Duarte MD: Data collection, data analysis, writing the paper Marcos; Jafif Cojab MD: Data collection, data analysis, writing the paper

Guarantor

Alberto; Valdes Castañeda MD FACS

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Declaration of competing interest

There was no conflict of interest.

References

- [1] D.J. Close, J. Humes, Simpson acute appendicitis, *BMJ* 333 (2006) 530–534.
- [2] M.K. Liang, H.G. Lo, J.L. Marks, Stump appendicitis: a comprehensive review of literature, *Am. Surg.* 72 (2006) 162–166.
- [3] A.A. Mangi, D.L. Berger, Stump appendicitis, *Am. Surg.* 66 (2000) 739–741.
- [4] J.M. Green, D. Peckler, W., Scuhmer Incomplete surgical removal of the appendix; its complications, *J. Int. Coll. Surg.* 29 (1958) 141–146.
- [5] T.E. Wright, J.F. Diaco, Recurrent appendicitis after laparoscopic appendectomy, *Int. Surg.* 79 (3) (1994) 251–252.
- [6] J. Fischer, *Fischer's Mastery of Surgery*, 7th ed., LWW, Philadelphia, Estados Unidos, 2018.
- [7] E. Dikicier, F. Altintoprak, K. Ozdemir, et al., Stump appendicitis: a retrospective review of 3130 consecutive appendectomy cases, *World J. Emerg. Surg.* 13 (2018) 22, <https://doi.org/10.1186/s13017-018-0182-5>.
- [8] A.A. Mangi, D.L. Berger, Stump appendicitis, *Am. Surg.* 66 (2000) 739–741.
- [9] J.M. Green, D. Peckler, W. Scuhmer, Incomplete surgical removal of the appendix; its complications, *J. Int. Coll. Surg.* 29 (1958) 141–146.
- [10] M. Uludag, A. Isgor, M. Basak, Stump appendicitis is a rare delayed complication of appendectomy: a case report, *World J. Gastroenterol.* 12 (2006) 5401–5403.
- [11] B. Manoglu, G.G. Niflioglu, E. Uysal, A rare case: appendectomy after connected stump appendicitis perforation of the cecum, *J. Clin. Anal. Med.* 6 (4) (2015) 539–541.
- [12] Close P.M. Rao, M.J. Sagarin, C.J. McCabe, Stump appendicitis diagnosed preoperatively by computer tomography, *Am. J. Emerg. Med.* 16 (1997) 309–311.
- [13] Close K.E. Roberts, L.F. Starker, A.J. Duffy, R.L. Bell, J. Bokhari, tStump appendicitis: a surgeons dilemma, *JSLs* 15 (2011) 373–378.
- [14] Franchi T. Agha RA Sohrabi C, Guideline: updating consensus Surgical CAse REport (SCARE) guidelines, *Int. J. Surg.* 2020 (84) (2020) 226–230.