

AETIOLOGY AND LAPAROSCOPIC INTERVENTION IN ACUTE APPENDICITIS

Gavrilă (Brata) Roxana Daniela¹, Maghiar Teodor Traian², Maghiar Marius Adrian², Maghiar Octavian², Domocos Daniela³

¹Pelican Clinical Hospital Oradea, Corneliu Coposu 2, Oradea, Romania, e-mail: roxana.gavrila@yahoo.com

²University of Oradea, Faculty of Medicine and Pharmacy, P-ta 1 Decembrie no. 10, Oradea; e-mail: uro_doruletul@yahoo.com

³University of Oradea, Faculty of Dental Medicine, P-ta 1 Decembrie 5, Oradea, Romania, e-mail: danadd769@gmail.com

Abstract

The obstruction of the appendix lumen has always been considered as the primary pathogenic modification. While obstruction can be observed in 40% of the cases, recent studies have shown that mucosal ulceration is the inciting event in most cases of acute appendicitis. The causes of the ulceration are unknown, it seems that a viral aetiology might also be involved. It has been suggested that infection with Yersinia could lead to the disease as increased complement levels were found in over 30% of the proven cases one week after the surgery. In case of obstruction, acute appendicitis is usually caused by a small fecaloma which results from the faeces that became impacted and that accumulated around the plant fibres. Adenopathies associated with viral infections, intestinal worms and tumours can also cause the obturation of the lumen.

Key words: lumen, obturation, adenopathies, inductor

INTRODUCTION

Appendicitis occurs more frequently in the second and third decades of life. The condition can be encountered at any period of life, but it is relatively rare at extreme ages. Men and women are equally affected, except for the period between puberty and 25 years when men are more affected. Perforation is relatively more frequent in young children and in the elderly when mortality is also the highest (Romano et al., 2009).

The pain syndrome in the right iliac fossa refers to those situations where, using the full range of clinical and paraclinical examinations, it is not possible to establish with certainty which organ in the sub-umbilical level of the right hemiabdomen causes the clinical suffering.

Laparoscopic appendectomy is performed more and more successfully, but the exact impact of this treatment compared to open surgery, especially in case of rupture, has not been clarified, except for the cases when there are doubts about the diagnosis (Davico et al., 2004). Thus, the treatment of these clinical cases consists of performing a small-sized

laparotomy in the right iliac fossa, but that does not allow a proper exploration of the surrounding viscera. An inflammatory appendix requires an appendectomy, the case being considered practically solved. Problems arise when macroscopically the appendix is normal and when larger incision is needed for a better intraoperative exploration. Patients are left with a larger incision and with a higher risk for subsequent wound complications, but, from the point of view of the affected organ, patients are treated. The most unpleasant situation is considered that of those patients who undergo appendectomy as surgeons consider that the clinical suffering is caused by an incipient inflammatory disease of the appendix when in fact this suffering is caused by another neighbouring organ, most commonly the reproductive organs in the case of female patients. Postoperatively, the evolution is unfavourable and sometimes even tragic. Difficulties of preoperative diagnosis occur especially in female patients due to the anatomical proximity of the appendix to the internal reproductive organs, similar clinical signs and similar frequency of their impairment during the active reproductive period (David et al., 2019). This explains the considerably higher rate of female patients with this diagnosis. Although much rarer, this diagnosis may appear in male patients, old age or the atypical clinical context raising the suspicion of non-appendicular suffering.

MATERIAL AND METHOD

In order to obtain the proposed objectives, the authors did a retrospective study.

The study period extended over 5 years (01.01.2014-31.12.2019).

The material basis of the study included the patients' observation sheets from the hospital archive, respectively the computerized data of the two units.

RESULTS AND DISCUSSION

Table 1

Distribution of cases according to aetiology

Aetiology	Female		Male		Total	
	No.	%	No.	%	No.	%
Bacterial infection	80	53.7	70	58.3	150	5.8
Viral infection	24	12.1	16	13.3	34	14.9
Undigested plant residues	15	10.1	12	10.0	27	10.0
Parasites	12	8.1	6	5.0	18	6.7
Foreign bodies	18	19.7	16	13.3	40	12.6
Total	149	100.0	120	100.0	269	100.0

The data obtained were interpreted statistically based on the determination and calculation of several series of indices: the ratio of OR quotas (with a 95% confidence interval), the chi-squared test, the Fisher's exact test (to determine the statistical significance), the absolute and relative frequency.

Most cases of acute appendicitis were predominately of bacterial aetiology (55.8%), followed by the viral one (14.9%), regardless of the severity of acute appendicitis ($p = 0.324$).

Acute appendicitis is a disorder that has many causes and obscure pathogenesis. The mucus secretion relaxes the organ, increasing the intraluminal pressure up to 60 cm H₂O. Thus, the bacteria in the lumen multiply and eventually invade the wall of the appendix. Due to the increased intraluminal pressure, the venous return and the arterial circulation are compromised. If the process is slow, the adjacent organs such as the terminal ileum, the cecum and the omentum may act like a barrier around the appendiceal region so that a localized abscess will develop, while the rapid deterioration of the circulation may result in perforation with free abscess in the peritoneal cavity. Subsequent ruptures of the primary appendiceal abscesses may produce fistulae between the appendix and the bladder, the small intestine, the sigmoid or the cecum. Occasionally, acute appendicitis may be the first manifestation of Crohn's disease.

Chronic infection of the appendix can occur in tuberculosis, amoebiasis, actinomycosis. According to a very useful clinical axiom, the chronic inflammation of the appendix is not normally a cause of prolonged abdominal pain that lasts for several weeks or months. However, it is clear that recurrent seizures of acute appendicitis occur often with complete resolution of inflammation and symptomatology between seizures. Recurrent acute appendicitis may become more common due to uncontrolled use of antibiotics and due to the long appendiceal stump that has become more and more frequent following the use of laparoscopic appendectomy (Kelly et al., 2015).

An open approach and an appendectomy in a patient presenting the clinical signs of the painful syndrome, even when an ultrasound examination shows normal internal reproductive organs, can often lead to an mini incision appendectomy without exploring the reproductive organs. Thus, in the case of unnecessary appendectomies, the risk of post-appendectomy complications is not to be neglected. Certain situations when the postoperative evolution of a sub-diagnosed non-appendicular disorder require reintervention in female patients who may be in different stages of hemorrhagic or septic shock.

It can therefore be stated that laparoscopy allows accurate and fast differential diagnosis. However, all clinical examinations, usual biological tests and ultrasound (from the paraclinical examinations) must be run before considering the laparoscopic intervention. If the patient does not present an acute surgical abdomen, other imaging, radiological and endoscopic examinations are to be considered as well as histological or bacteriological examinations if the case. Non-surgical diagnoses - ureteral colic, salpingitis, enterocolitis, uncomplicated diverticulitis, normal pregnancy should be excluded before considering the laparoscopic intervention.

Exploratory laparoscopy has relative contraindications in patients with adhesive syndrome, occlusive syndrome or bulky abdominal tumours, generalized peritonitis (small chances for the intervention to be performed laparoscopically). Obviously, in patients with severe cardiorespiratory symptoms, classical exploration under regional or even local anaesthesia is to be preferred in order to avoid the side effects of the pneumoperitoneum.

Prior to surgery, besides a proper rebalancing, patients must be informed on their condition, possible evolution, anticipated technical possibilities and associated risks. All patients should be warned about a possible conversion to classical surgery if the case.

Therefore, there is a wide variety of conditions that present pain in the right iliac fossa and where laparoscopy represents the current method of investigation despite its invasive nature. Experience has led to a reduced percentage of mortality (0.1%) and morbidity (3.4%), the diagnostic sensitivity being far superior to the imaging explorations (ultrasound, computed tomography, magnetic resonance imaging). The method allows direct visualization of the lesions, highlights lesions with $F = 2-3$ mm (compared to 1-2 cm in the case of CT, MRI), collects (targeted and in the requested quantity) samples of biological material (for bacteriological, cytological, histopathological examination) and, last but not least, it allows the control of associated incidents/accidents (bleeding, perforation of the organs in the cavity).

Eventually, gangrene and organ perforation occurs. Statistical analysis of the data shows that most cases of acute appendicitis are predominately of bacterial aetiology (55.8%), followed by the viral one (14.9%) regardless of the severity of acute appendicitis (David et al., 2019).

The retrospective study “The Importance of Fecaliths in the Aetiology of Acute Appendicitis”, conducted by Engin et al., specifies that intraluminal pathology is likely to play a major role in the development of acute appendicitis. Intraluminal pathological findings may also be observed in healthy persons and this condition does not point to acute appendicitis. The disease progresses from intraluminal fecalith, with no inflammation, to

perforation from the beginning. There are several explanations on the formation of fecaliths. Abdominal ultrasound, computed tomography and magnetic resonance imaging techniques can decide the diagnosis of fecalith.

According to the study “The Role of Laparoscopy in the Pain Syndrome in the Right Iliac Fossa” the pain syndrome in the right iliac fossa refers to those situations where, even when using the full range of clinical and paraclinical examinations, it is not possible to establish with certainty which organ in the sub-umbilical level of the right hemiabdomen causes the clinical suffering. Difficulties of preoperative diagnosis occur especially in female patients due to the anatomical proximity of the appendix to the internal reproductive organs, similar clinical signs and similar frequency of their impairment during the active reproductive period. This explains the considerably higher rate of female patients with this diagnosis. Although much rarer, this diagnosis may appear in male patients, old age or the atypical clinical context raising the suspicion of non-appendicular suffering.

Laparoscopy allows accurate diagnosis and the minimally invasive and targeted treatment of the lesions (Davico et al., 2004).

CONCLUSIONS

From an aetiological point of view, the presence of fecaloma, lymphoid hyperplasia, parasites, undigested plant residues, foreign bodies represents the cause of acute appendicitis.

Laparoscopy has a double role, diagnostic and therapeutic. Thus, it allows the complete diagnosis and, consequently, the resolution during the same surgery of all the surgical causes that are at the origin of the painful syndrome.

Laparoscopy allows surgical intervention targeted on the diseased organ, reduces the number of unnecessary appendectomies and, essentially, avoids “white” exploratory laparotomies with high risks of morbidity. The indication of laparoscopic approach is elective based on the suspicion of non-appendiceal (surgical) pathology. Besides female patients in the active reproductive period, patients over the age of 45 years and those with disorders of the immune system also benefit of laparoscopic explorations. Laparoscopy is indicated in these categories of patients when further examinations do not identify the affected organ or when further investigations cannot be performed. Even if the laparoscopic intervention will not be performed, the method facilitates the choice when laparotomy is considered the appropriate approach for maximum surgical comfort.

Laparoscopy is also indicated in obese patients when the exploration by classic incision becomes a laborious operation with increased postoperative morbidity. Compared to classical surgery, laparoscopic interventions have many advantages: complete diagnostic and therapeutic role, minimally invasive approach (reduced visceral and parietal trauma, reduced postoperative pain, fewer complications, reduced hospitalization, rapid socio-professional reintegration, low costs, aesthetic benefits). Of course, when laparoscopy is considered, one must take into account the known absolute or relative contraindications of the laparoscopic approach.

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