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Summary: Stercoral peritonitis (fecal peritonitis) as the gravest contamination of the abdominal cavity remains still very severe event fol- tion classifications can help with decision about surgical procedure lowed by high morbidity and mortality rate. The most common origin of perforation is diverticular disease and colorectal tumor, other origins are accidental. The treatment consists of surgery and intensive medical care. Successfull can be only resectional surgery, when a septic source is taken away, contamination is stopped and a belly is cleared. The problem is a low ability of critically ill patient to under-

go an operation. The usage of peritonitis severity and general condiand can influence a treatment strategy.

The issue gives a review about some aspects of a stercoral peritonitis. AuthorĎs work-place experience based on the treatment of 13 patients with stercoral peritonitis during a period of 15 years is shortly presented. Key words: Stercoral peritonitis - origin - classification - surgery prognosis.

KLINICKÁ ONKOLOGII ZVLÁŠTNÍ ČÍSLO · 30

Stercoral peritonitis (fecal peritonitis) as the gravest contamination of the abdominal cavity remains still very severe event followed by high morbidity and mortality rate. J.C.Goligher wrote more than thirty years ago that "treatment of the carcinoma of the colon complicated by perforation and peritonitis make very melancholic reading", documenting this opinion by 90% mortality by patients with stercoral peritonitis from perforation of stercoral ulcer and 70 % mortality after perforation of growth (9).

The urgent laparotomy and surgical treatment of the site of perforation as well as cleaning of belly represent also nowadays the main surgical principle. The availibility of very intensive perioperative care and other medical progress involved this entity as well and improved the results. Stercoral peritonitis is a rare condition of various origin and different gravity, leaving several possibilities for surgeon decision depending on the conditions found to be present. That is the reason for making some review about causes, classification, surgical and general treatment and nowadays results.

The origin of large intestine perforation

Colonic carcinoma is one of common causes of stercoral peritonitis. There are two main sites of perforation: growth or proximal part of bowel, usually ascending colon, involved due to diastatic perforation from long-lasting complete distant obstruction. The frequency of perforations represents some 15 - 25% of all urgently operated on colonic tumors, only exceptionaly more than 30 % , in Czech literature the frequency ranged from 2 - 25 % incidency (Hájek, Maňhal, Vlasák, Vysloužil; summ. in 13) what represents usually the ammount from 10 to 30 patients. These datas agree with majority of articles presenting simmilar count of treated patients usually during ten years period (18,22,25), the major group is uncommon (5). The average patient age about seventy corresponds well with the top of incidency of colorectal cancer. Tumor stage III and IV predominates (18). The attention is concerned with tumor stage and resectability of the lesion but the description of the peritonitis degree peritonitis is usually hidden. The opinion that tumor patients with perforation are considered to have a bad prognosis and a reduced long-term survival will be discussed bellow.

According to the frequency **diverticular disease** is the most frequent cause of perforation and stercoral peritonitis. The ammounts of refered patients are major and reach a number of one hundred (6,12,22,28). Remarkable is the group of 300 patients with complicated diverticular disease in national British audit (31).

The peritonitis severity stratification using Hinchey score or MPI allow a comparison of treatment modalities and results and also to aproximate, that stercoral peritonitis represents one fifth of all peritonitis of diverticular origin.

Other diseases lead to colonic perforation with less frequency. Despite the fear of diastatic perforation in **colonic pseudoobstruction** only 1 report on Medline was found.

Hirschprung disease can also cause free perforation. Free colonic perforation in inflammatory bowel diseases especially in **ulcerative colitis** is a result of toxic megacolon. While Goligher stated the incidence 2 - 3 % at 60' (9), 20 years later Softley reported only 0.3 % (27). In patients with **Crohn's disease** the slow increase to 1.5% is registred, free perforation without toxic megacolon is more frequent than in UC (21).

Stercoral peritonitis can occur in some inheritary diseases, it means in **systemic diseases**, in patients with impaired collagen metabolism - **Ehlers-Danlos syndrom type IV**, or in endocrinopathies; perforative peritonitis associated with **parathyroid adenoma** were described (11). The perforation can occur without any known cause or concomitant disease as a **spontaneous perforation**; rare reports (30) and Medline document some 70 cases in recent literature. Despite to the denomination "spontaneous" some role of **ischemia** participates due to alterations of the intramural vascular pattern (3). Curious perforation due to colonic **scyballas** even in the end colostomy were reported (26). Finally **solitary colonic** **ulcer** as a origin of perforation was described (17). Colonic perforation can occur as a result of blunt or penetrating **abdominal injury**, as an complication of ingested **foreign bodies**, e.g. chicken bones, or introduced per anum. Iatrogennic origin includes colonic perforation as a complication of long-term medical therapy, e.g. **corticoids or NSAIDs** (14), as a serious complication of **transplant surgery** of kidneys and lung (23), or as a complication of abdominal vascular surgery. The large spectrum of perforations arises from **colonic endoscopy**, both diagnostic and therapeutic these events thanks to empty bowel and early recognition have got (fortunately) a good prognosis.

Location

The common site of perforation is a distant part of the colon, especialy sigmoid colon. It is the most common location of diverticular disease involvement and also of malignat growth. The perforation is possible at all other parts of large intestine, including appendix. The right colon is usually involved by diastatic perforation by colonic wall necrosis due to impaired blood perfusion through elongated and narrowed vessels. That is why it is recommended to check the transversal diameter of caecum by X-rays, the risk of perforation arises in diameter above 12-14 cm. Mentioned dilation should exclude the delay when surgery for distant colonic obstruction is indicated and supports the decision, when pseudoobstruction or bowel dilation by IBD is expected. Diverticular perforation can occur also on the right or transverse colon despite that fact, that diverticulas localised there are only few or even single. The most distal parts are perforated by introduced foreign bodies or spontaneously by hard stool.

Symptoms and diagnosis

No typical symptom exists for stercoral peritonitis. The **onset** ranged from sudden one

accompanied by peritoneal signs to sneaking distension of the belly with minimal other physical finding. The **patient history** should be taken into account namely in previous

palpable or US or CT detecable mass (1,31). The **general pati**ent condition range also from (rare) minimal alteration to grave septic shock. Pyrexia, grave tachycardia, leucocytosis and free air at **X-rays** intensifies expectation of the finding of generalized peritonitis with faeces in the peritoneal cavity (6,31).

Prognosis and classification of peritonitis

The prognosis depends on the severity of peritonitis, on the age, on general chronic and acute patient condition (including the advance of underlying malignant disease) and of the choice of a treatment.

Two classifications of peritonitis degree are commonly used four stages **classification proposed by Hinchey** et al. **(22)** and the **Mannheim Peritonitis Index** - M P I - introduced by Wacha et al (20). While the first one describes only the extent of intraabdominal sepsis, the second one takes into account the age, gender, present organ failure, presence of malignity, duration and origin of peritonitis and finally the features of intraperitoneal content. In both Schemas stercoral peritonitis takes the gravest degree. According to these Schemas the recent datas about mortality of stercoral peritonitis range from 19 to 48 % (12,22,25,31).

The general statement changes are expressed by different scooring systems - the APACHE, resp. APACHE II(16), SAPS and SAPS II (19), POSSUM (24) and HDWS (8) are the most common.

While the **septic complications** have been responsible for the **immediate result** of surgical treatment, in tumor patients both an **advanced tumor** and septic complications of peritonitis have been made responsible for the **bad prognosis of malignant perfora-**tion. Nespoli found worse prognosis for patients with tumor than diverticular perforation, probably related to more advanced age and to higher severity score of peritonits in patients with cancer (22). Some suggest an independent prognostic effect of perforation on survival and report significant differences in long-term survival after adjustment for tumor stages (25), the others demon

strate a significant influence of degree of peritonitis without the difference in long-term survival comparison between groups of patients with perforated to uncomplicated tumor. Patients with perforated tumors have got increased occurence of septic multiple-organ failure in comparison with benign perforations (18).

Surgery and general treatment

The treatment of peritonitis includes surgery and intensive medical treatment or resucsitation respectively. Both parts underwent significant progress and influenced a results.

The task of surgery is to localise a septic source, to stop a contamination and to clear up a belly. Safety considerations have led surgeons to perform as minimal procedures as possible in the past, respecting that the majority of patients was already very ill, compromised by shock and despite resuscitative measures never fit for an operation.

The minimal access using a stoma creation and drainage in acute surgery, initial stage of three stage procedure in resectional lesions, did not meet two first intentions sufficientely and resulted to the mortality about 50 % in the past and nowadyas as well. Acute resection as effective procedure removing the source of sepsis (even of malignancy) was adopted slowly from 50'. It improved surgical results and decreased mortality after colonic perforation to the level of 30 %. Another question occured: if to finish the surgery by stoma as the Hartmann's or Mikulicz's two stage procedure, or to perform the immediate anastomosis. Despite the interest of surgeons to convince that one of these methods is superior, studies failed namely in patients with complicated colorectal tumor. The survival benefit of single-stage ("primary") procedure was not summarily proven enough(25). Due to experience of high anastomotic laekages rate and persistent peritonitis and sepsis in patients with stercoral peritonitis a discontinuity operation remains the standard one for left-sided perforations untill nowadays (2,6,13,18). An extensive resection finished by ileocolic anastomosis represents an alternative method, which minimizes the risk of leakage to 5 %.

The analysis of results of methods used for treatment of colonic perforations is not free of problem. Nespoli et al. gave the results of treatment of stercoral peritonitis as follows: 20% mortality after primary resection and anastomosis, 40% mortality after Hartmann's procedure a 72% after simple colostomy (22). Simmilarly Kriwanek et al. presented 35%, 38% a 100% for patients with perforated tumors and 9%, 13% and 66% respectively for patients with benign perforations in the same sequale of surgical procedures (18). These results suggest that the mortality rate is significantly lower by primary resection rather than by Hartmann's procedure or by colostomy, but the choice of operation depends on the general condition; primary resections were performed with minimally alterated patients and the most simple procedures with desperately ill ones. So the real determinant of outcome is not the surgical procedure but the overwhelming septic process measured by scoring systems.

The segmental resection with ileocolic anastomosis is considered to be the optimal surgical option for treatment of stercoral peritonitis from right-sided lesions and the Hartmann's procedure for left-sided perforations (2,6,18,22). The extensive resection (subtotal colectomy) is recommendable for diastatic or multiple perforations.

The others procedures like suture of perforated site stand out of standard procedures.

Surprisingly in the literature a little attention is given to the maneuvers at the finish of surgery, e.g. to the **peritoneal lava-ge, drainage, stagged laparotomy or laparostomy**. The decision depends on the severity and duration of sepsis, and on the viability of visceras. In principle, only the drainage is appropriate already when no doubt about removing of all involved tissue and complete clearing out of the belly (29). The stagged (scheduled) re-laparotomy allows to check the abdomen and remove fluid collections unavailable other way. Laparostomy enables to decrease intraabdominal pressure.

The **intensive medical treatment** on **ICU** is needed beginning at the admission for treatment. Central venous and urinary catheters, electrolyte and volum replacement and resuscitation of circulation instability are the priorities of the whole perioperative period, including the artificial ventilation in some patients. Broad-spectrum antibiotic therapy is obligatory. It is necessary to remind that no preparation can improve the condition in patient with stercoral peritonitis basically and that the surgery should not be postponed (4).

Respiratory, urinary and wound infections are the most common postoperative complications. The postoperative morbidity and mortality are caused usually by a cardiac decompensation or by multiple organ dysfunction (2,6,22,25).

Own experience

During the period of 15 years 87 patients with peritonitis of large intestine were operated on. There were 38 males (average age 76.4 years) and 49 females (average age 71.3 years). According to the origin the tumor caused the peritonitis in 46 cases, in 39 of them due to perforation of the tumor, by 7 patient due to distant perforation. Diverticular disease caused the peritonitis by 32 patients, ulcerative colitis by 3 ones. 7 patients were operated for peritonitis of other origin. From the whole group of patients stercoral peritonitis was registred by 13 patients. The origin was tumor by four, diverticular disease by five; ulcerative colitis, pancreatitis, blunt abdominal injury and ischemia was simmilarly the origin every by one patient. There were performed two segmental resections, one stoma and one subtotal colectomy by tumor perforations, two last quoted died; myocardial infarction and multiple organ failure were the causes of a death. Three tumor lesions were resectable, one was advanced and fixed. The spectrum of operations for perforations of diverticular origin consists of one stoma creation with drainage, one Mikulicz procedure and three segmental resections; two of them were finished with a anastomosis and one as a Hartmann's procedure. The last surgery was finished as laparostomy. The patients after stoma surgery and after Mikulicz procedure died, both from organ failure. The patient with perforation by ulcerative colitis underwent subtotal colectomy and survived. All three patients operated on for perforations of different origin underwent segmental resections, two of them survived, one of them had got a laparostomy. In the whole group 11 colonic resections were performed and 2 stoma surgeries with drainage, two cases were treated by laparostomy. Five deaths were registred (38.5 %).

Discussion and conlusions

Despite simmilar finding of faecal content in the peritoneal cavity the entity of stercoral peritonitis differs according to origin, duration, septic involment, general condition and age. The peritoneal signs are usualy a reason for surgery, supported only by some patients by X-rays, CT and US finding. Already present or comming manifestation of septic shock is obvious and requires an intensive care. Without any doubt an intensive care management contributes to success of treatment significantly, but even an adequate care is not effective enough before the surgery and removing of the intraabdominal sepsis (2).

The surgical treatment is hopefull only when radical surgery eliminates the septic contamination with sure (6,12,22,25) The extensive surgery is limmited mainly by patient condition; a choice of operation type should take into a count the value of some scoring system. While one stage procedure with bowel continuity restoration even by stercoral peritonitis leads nowadays to same immediate results as an discontinuity procedure (22,25), the majority of surgeons (including author) prefer a discontinuity ones (13).

It is possible to conclude: stercoral peritonitis is an extreme condition even for experienced surgeon. It requires a fast recognition, well intensive care, radical surgery to be effective enough, as well as beeing performed gently enough not to put down the patient. Even already 2400 years ago it was Hippocrates who noted typical signs predicting an early outcome - pointed nose, halo eves and cold ear auricles (10).

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Hippocrates is also an author of an aphorism saying that hopeless events need risky treatment. In connection with stercoral peritonitis both proclamations remains valid.

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