



Professional article

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DIFFERENTIAL DIAGNOSIS AND THE INVESTIGATION PROTOCOL IN CHILDREN WITH RECURRENT ABDOMINAL PAIN

SUMMARY

Recurrent abdominal pain (RAP) is defined as abdominal pain which occurs at least once a month for minimum three months and is of such severity that it interferes with the child's daily activities. RAP presents a great burden to both the child and parents, and considering its tendency to recur, it significantly affects the whole family's comfort and functioning. Since RAP can be caused by different kinds of abdominal and extra-abdominal diseases, the differential diagnosis may be very difficult. On the basis of its clinical presentation, RAP can be differentiated into three types - recurrent isolated paroxysmal abdominal pain, abdominal pain associated with symptoms of dyspepsia, and abdominal pain associated with altered bowel pattern – therefore, diagnostics of the underlying cause, it will depend on the type of pain.

Key words: recurrent abdominal pain, child, diagnosis

Recurrent abdominal pain (RAP) is defined as abdominal pain which occurs at least once a month, for at least three months, and is of such severity that it significantly interferes with the child's daily activities. RAP presents a great burden for both the child and parents, and considering its tendency to recur, it significantly affects the whole family's comfort and functioning. RAP is one of the most frequent types of recurrent pain in children, and at least, one out of ten children seen in pediatric outpatient clinics has RAP. Due to severity of attacks, children with RAP are often referred to pediatric surgeons, and not infrequently hospitalized for observation. In a five-month study, a group of authors showed that out of a total of 6 300 children referred to pediatric surgeon in the studied period, 761 (12%) had RAP, and as many as 313 of those with RAP (41.13%) were hospitalized. An organic cause of RAP was surgically confirmed in only 13.43% of the hospitalized children (1). Given the recurrence of the pain, it is understandable that the

parents are anxious to find its cause as soon as possible. However the benign course, many individual differences, variability of pain manifestation, often associated with numerous vegetative symptoms, and non-specific/common physical findings make RAP a great differential diagnostic challenge in daily practice.

The first question that arises in the case of a child with RAP is related to the nature of the abdominal pain, i.e. whether the pain is a symptom of organic or functional disease. It is considered that the pain lasting longer than six months requires appropriate investigation so as to confirm or exclude organic etiology. The literature data on proportion of organic etiology in the genesis of RAP varies. According to Apley, it is 8%, although most authors report the incidence ranging from 10-20%.

Since RAP may result from various diseases of the abdominal and extra-abdominal organs, differential diagnosis of the underlying cause is very broad. When RAP occurs as an isolated disease, it is

called *isolated paroximal abdominal pain*, and differential diagnosis will include the following groups of disorders (2):

1. Obstructive diseases:
 - Crohn's disease,
 - Malrotation with/without volvulus,
 - Intussusception,
 - Adhesion after surgical procedures,
 - Small intestine lymphoma,
 - Endometriosis,
 - Mesenteric lymphadenitis,
 - Infection (yersiniosis, tuberculosis),
 - Vascular disorders,
 - Eosinophilic gastroenteritis,
 - Angioneurotic oedema,
2. Appendiceal colic,
3. Musculoskeletal disease,
4. Dysmenorrhea,
5. Epilepsy,
6. Acute intermittent porphyria,
7. Ureteropelvic obstruction,
8. Psychiatric disorder,
9. Functional abdominal pain

In the case of *RAP with dyspepsia*, where dyspepsia presupposes the symptoms of bloating/gaseousness, early satiety, nausea, and sense of heaviness/fullness, the pain indicates dysfunction of the proximal gastrointestinal tract. This dysfunction may be caused by the following groups of diseases:

1. Diseases associated with inflammation of the upper gastrointestinal tract:
 - Gastroesophageal reflux disease,
 - Peptic ulcer,
 - *Helicobacter pylori* gastritis;
 - Crohn's disease;
 - Eosinophilic gastroenteritis;
 - Menetrier's disease,
 - Cytomegalovirus gastritis;
 - Parasitic infection (*Gardia Lamblia*, *Blastocystis hominis*),
 - Varioliform / lymphocytic gastritis,
 - Henoch-Schonlein purpura.
2. Motility disorders:
 - Idiopathic gastroparesis,
 - Biliary dyskinesia,
 - Intestinal pseudo-obstruction.
3. Other causes:
 - Chronic pancreatitis, chronic hepatitis, cholecystitis
 - Gastrointestinal tract obstruction,
 - Psychiatric disorders,
 - Abdominal migraine.

The third type is *RAP associated with irregular bowel pattern*, indicating intestinal dysfunction. The following groups of diseases may produce this manifestation:

1. Idiopathic intestinal disease:
 - Ulcerative colitis;
 - Crohn's disease;
 - Lymphocytic colitis;
 - Collagenic colitis.
2. Infectuous causes:
 - Parasitoses (*Gardia Lamblia*, *Blastocystis hominis*, *Dientamoeba fragilis*);
 - Bacterial (*Clostridium difficile*, *Yersinia enterocolitica*, *Campylobacter jejuni*, *Mycobacterium tuberculosis*).
3. Lactose intolerance
4. Constipation sequelae (megacolon, encopresis, intermittent sigmoid volvulus)
5. Drug-induced diarrhea
6. Gynecological diseases
7. Neoplasia (lymphoma, carcinoma)
8. Psychiatric disorders

Considering such a broad differential diagnosis of *RAP* in children, it is clear that no investigation protocol can be precise enough, and no universal decision algorithm can be used in all cases of children with *RAP*.

Although gastroenterology has numerous, often aggressive, diagnostic techniques, the main principle, to start from the simple ones and progress with more complex ones, is employed with *RAP* as well. History plays a key role, and if taken correctly, it is considered to make fifty per cent of diagnosis. History-taking involves a detailed interview with the child's parents and the child separately (which is especially emphasized in the case of an adolescent), in order to obtain information on the features of the pain, such as first occurrence of complaints, frequency of painful attacks, location and intensity of pain, duration of individual episodes, characteristics of pain, diurnal-nocturnal pattern of pain, associated gastrointestinal and non-gastrointestinal complaints, association with taken meals, and how the pain ends. Presence of symptoms of a systemic disease, dietary details, previous medical and other treatments, association of complaints with traveling, or similar complaints in other family members, also make important anamnestic data (3,4). Events precipitating abdominal pain in the child are also of special importance during the interview with the parents, as well as family and personal history. Following history, physical examination is performed (a complete physical examination includes assessment of bodily parameters and any variation from standard values

and if required rectal examination). Finally, the type of abdominal pain is determined and appropriate investigations performed.

The first step in diagnosing abdominal pain is to perform standard diagnostic procedures including routine laboratory analyses, such as erythrocyte sedimentation rate, complete blood count, complete urine and stool examination for parasites, and abdominal and gynecological ultrasound. Ultrasonography as a fully non-invasive technique is of greatest importance in excluding an organic cause of RAP. What is usually emphasized is complete abdominal examination with pelvic outlet ultrasonography. For certain indications, if a chronic intestinal disease is suspected, the intestinal wall thickness/density is measured and the deviation from normal values assessed. If required, diagnostic evaluation will include biochemical analyses of liver, pancreas or kidney, and specific examinations of the stool or urine.

Endoscopy is especially important in diagnosing the upper gastrointestinal tract or intestinal dysfunction. Depending on indications, radiology may have priority over endoscopy (e.g. in case of isolated abdominal pain or suspected gastrointestinal tract obstruction), or be secondary, while sometimes these techniques may be used together. All methods are available, from a plain X-ray to small bowel follow-through. Enteroclysis has a great importance in pediatric patients as well as in adult gastroenterology. The diagnostic procedures utilized in examination of children with RAP are presented in *Figure 1*, and the diagnostic algorithm is presented in *Figure 2*.

If no organic cause can be found after all available diagnostic procedures have been exhausted, the underlying cause of pain should be considered functional.

Early recognition of RAP in a child and adequate treatment have multiple beneficial effects to both the affected child and the families. In addition, it may decrease or even eliminate morbidity of functional nature and prevent development of an organic disease later in life. The imperative in the clinical practice of pediatricians and all others involved in the treatment of pediatric patients is a purposeful employment of diagnostic procedures, starting from the simplest and least-invasive techniques and advancing step by step towards more complex ones, depending on the nature of disease and obtained findings, in order to minimize diagnostic mistakes.

Figure 1. Diagnostic procedures utilized in examination of children with RAP

I History

II Physical examination:

1. complete physical examination,
2. bodily and vital signs,
3. digitorectal examination.

III Routine laboratory assessment:

1. ESR, blood tests,
2. Complete urine test,
3. Stool examination and perianal swab to parasites,
4. Ultrasound examination of the abdomen and pelvic outlet.

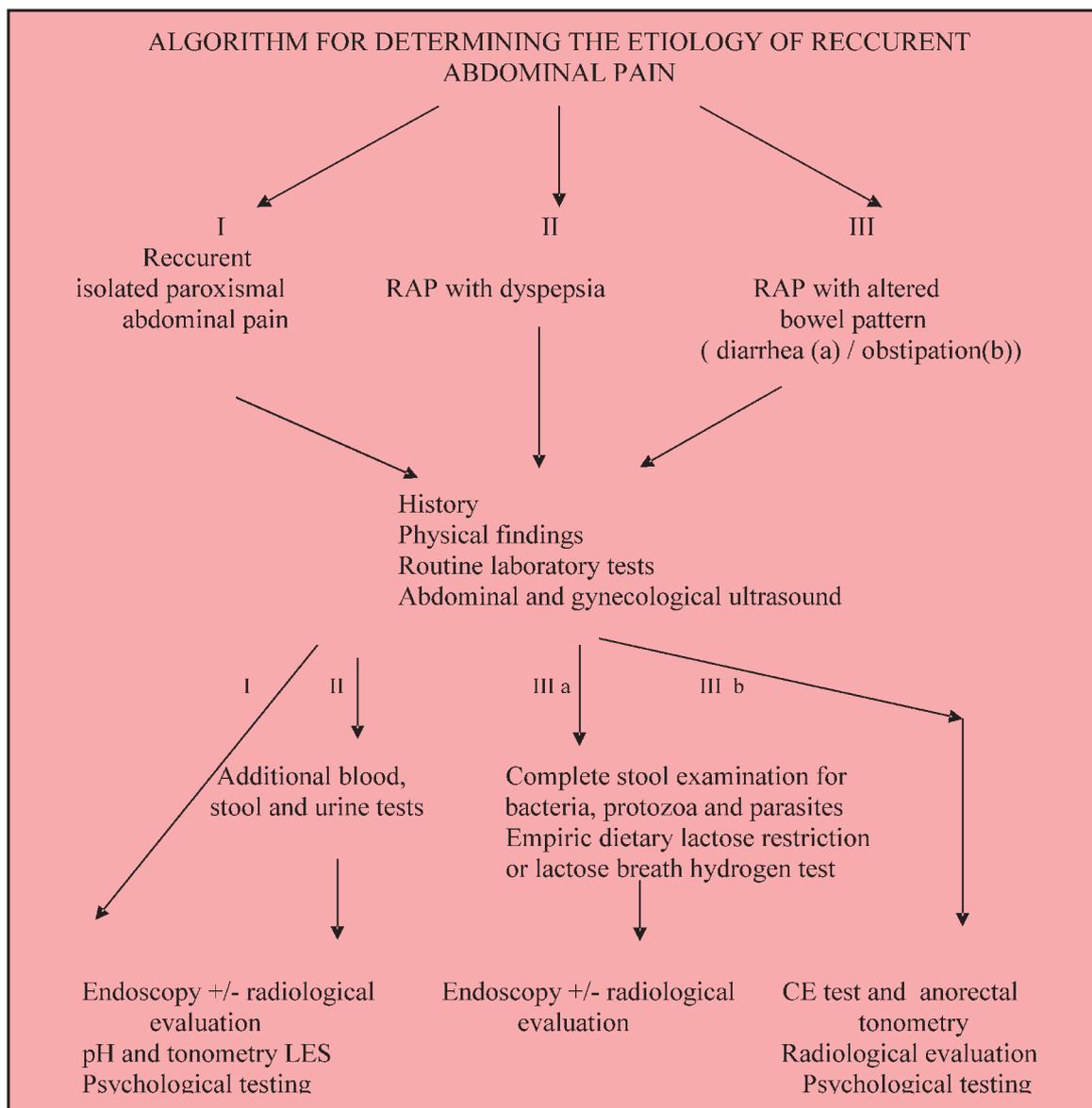
IV Additional procedures and analyses

1. Stool examination: for bacteria, intestinal protozoa (cysts and vegetative forms), occult blood, cytological analysis, PH and Clini test, empiric dietary lactose restriction or lactose breath hydrogen test,
2. Urine test for porphobilinogen,
3. Assessment of pancreas function (serum and urine amylase, the amylase: creatinine clearance ratio), hepatic function testing (electrophoresis SP, PT, ALT, AST, bilirubin, gama GT, ALP.),
4. grav index test.

V Other procedures regarding indications:

1. Endoscopy
 - upper / lower endoscopy
2. Radiology
 - Plain X-ray of the abdomen,
 - X-ray of the duodenum,
 - Barium enema,
 - small bowel follow-through,
 - enteroclysis,
 - endoscopic retrograde cholangiopancreatography,
3. Esophageal pH probe and lower esophageal sphincter manometry,
4. Anorectal tonometry and cholinesterase test
5. CT / MRI of the abdomen,
6. Electroencephalography,
7. Psychological testing.

Figure 2. Diagnostic algorithm in children with RAP



Legend:

LES - lower esophageal sphincter • CE test- cholinesterase test • RAP – recurrent abdominal pain

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DIFERENCIJALNA DIJAGNOZA I PROTOKOL ISPITIVANJA KOD DECE SA RECIDIVIRAJUĆIM ABDOMINALNIM BOLOM

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SAŽETAK

Abdominalni bol koji se javlja barem jednom mesečno, u toku minimalno 3 meseca i takvog je intenziteta da značajno remeti svakodnevnu aktivnost deteta, definiše se kao recidivirajući abdominalni bol (RAP). RAP i za dete i za njegove roditelje predstavlja veliko opterećenje a s obzirom na sklonost ka ponavljanju, značajno utiče na komfor i funkcionisanje cele porodice. Kako RAP može biti posledica raznih oboljenja abdominalnih i ekstraabdominalnih organa diferencijalna dijagnoza njegovog uzroka je veoma široka. Prema kliničkoj prezentaciji postoje tri tipa recidivirajućeg abdominalnog bola; izolovani paroksizmalni abdominalni bol, RAP udružen sa dispepsijom i recidivirajući abdominalni bol udružen sa poremećajem crevnog pražnjenja ili poremećajem karakteristika stolice, stoga je i dijagnostika uzroka uslovljena njegovim tipom.

Ključne reči: recidivirajući abdominalni bol, dete, dijagnoza