OPAQUE CLISMA: A BREAKTHROUGH IN THE CARE OF PEDIATRIC INVAGINATION

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ABSTRACT

Intussusception is the most common cause of intestinal obstruction in infancy and early childhood. It occurs when one segment of bowel (the intussusceptum) invaginates into an adjacent distal segment of bowel (the intussuscepien). The classic presentation is with intermittent abdominal pain, vomiting and redcurrant jelly-like stool. Diagnosis can be accurately confirmed with an ultrasound scan. Initial management is with fluid resuscitation and antibiotics. Following adequate resuscitation, treatment is usually with a non-operative air enema reduction under fluoroscopic guidance. If this fails to completely reduce the intussusception, the air enema may be repeated in patients that are clinically stable. The main risks associated with an air enema are bowel perforation, failed reduction and recurrence. Surgical intervention is indicated in patients presenting with perforation, those that are clinically unstable or where multiple air enemas have failed to reduce the intussusception. Surgery can be performed open or laparoscopic and involves attempted manual reduction of the intussusception and may require bowel resection and anastomosis.

WHAT IS INTENDED BY INTUSSUSCEPTIO IN PEDIATRICS

When we talk about intussusception we refer to one of the most frequent emergencies, concerning the occlusive syndrome in infants and children. This pathology is an abdominal urgency well known by pediatric surgery services, the phenomenon of which consists in the sliding of a portion of the intestine inside another immediately adjacent (Fig. 1), with consequent difficulty in the passage of faeces. Subsequently, the invaginated segments occlude the intestine, resulting in impaired blood flow with consequent ischemia, gangrene and perforation; in most cases this process is idiopathic. Intussusception tends to occur mainly between 3 months and 6 years of age and the incidence is between 1 and 4 cases per 1000 births with a male / female ratio of 3: 1. The peak of incidence is between 5 and 10 months of life. The most frequent site of intussusception is the ileocecal one (60-80%). The ileoleal and colo-colic type are less frequent. Intussusception represents one of the most common surgical emergencies.

WHAT ARE THE CAUSES THAT DETERMINE IT

Intussusception can be primary or secondary, depending on the type of cause that triggers it. The primitive one, which is found mostly in childhood, is generally determined by an increase of various kinds of intestinal peristaltic activity. This phenomenon is usually caused by viral infections of the gastrointestinal or respiratory tract which can cause an increase in volume (hyperplasia) of the lymphatic system in association with motor disorders of the intestinal wall itself. Intestinal peristalsis is the undulatory movement caused by the intestinal muscles that gradually push the contents of the intestine towards the rectum. The

Fig. 1 - Anatomical representation of intestinal intussusception between the small intestine and colon.

secondary one, less frequent in pediatric patients (2% of cases), refers instead to anatomical situations (Meckel's diverticulum, caecal appendix, polyp, intestinal parasites, intestinal duplication) and / or alterations of the intestinal wall with interruption of peristalsis.

WHAT ARE THE SYMPTOMS WITH WHICH IT MANIFESTS

The main symptoms of this pathology are vomit, faeces mixed with mucus and blood, abdominal pain, palpable abdominal mass and lethargy. Vomit, initially reflex and of a food type, tends to become biliary hour after hour, a sign of intestinal obstruction. The child initially feels relatively well in the intervals between

episodes. Later, when intestinal ischemia develops, the pain becomes stable, the child becomes lethargic, and mucosal bleeding leads to bloody stools on rectal examination and, sometimes, spontaneous evacuation of so-called "Currant Jelly Faeces", a sign of suffering from the intestinal wall. The pain, initially colic and intermittent, tends to become continuous within 12 hours and the child, initially agitated, becomes the less reactive to stimuli the younger he is. Perforation results in signs of peritonitis, with noticeable pain, defensive signs and stiffness. Pallor, tachycardia, and diaphoresis are indicative of shock.

■ HOW TO DIAGNOSE

In addition to the clinical diagnosis, the instrumental diagnosis (Fig. 2) is extremely important. It is based on the use of the following methods:

1. Direct radiographic examination of the abdomen, which documents the alteration of the normal distribution of intestinal gas;
2. Ultrasound, now preferred to radiological exam, as it does not use ionizing radiation;
3. Barium enema with contrast, with not only diagnostic purposes but also curative ones, given the possible resolution of the intussusception in 40-60% of cases.

The resolution of the intussusception is considered complete if it shows the passage of barium or air in the small intestine for at least 5-10 cm. If the reduction has been successful, the child is kept under observation for one or two days and, if no complications have occurred, once antibiotic prophylaxis has been suspended and feeding resumes, he can be discharged. In the event that the reduction attempt with the barium enema fails, the only treatment is surgical, if possible preceded by a further ultrasound check under anesthesia.

Purpose of the investigation:

The purpose of this examination is to successfully "relax" the intestine completely, in order to avoid surgery in the pediatric patient.

Treatment

- Air or gastrografen enema (Fig. 4)
- Surgery if the enema is unsuccessful or if perforation is present.

In the event that intussusception is diagnosed, an air insufflation enema is used for reduction, as it decreases

the likelihood of perforation and its consequences. In some cases, it is possible to try to cure intestinal obstruction by gradually filling the intestine from the rectum and pushing the invaginated intestine back, so as to resolve the intestinal obstruction. When this is not possible, surgery may be required to resolve the cause of the obstruction. Intussusception can be successfully reduced in 75-95% of children. If the air enema is successful (Fig. 2), children are observed at night to rule out occult perforation. If reduction fails or the bowel is perforated, immediate surgery is required. When reduction is achieved without corrective surgery, the recurrence rate is 5-10%. Treatment of primary intussusception is initially conservative. It consists in performing an enema with a water-soluble or airborne contrast agent, which confirms the diagnosis of intussusception and in most cases, successfully reduces it.

Experience at the infermi hospital in rimini, in the treatment of intestinal intussusception in the pediatric patient.

At the Rimini Infermi hospital it was possible to check first-line how the service is managed and delivered, and what equipment and tools are used. The examination is an investigation that is carried out in emergency conditions, however no special preparation is required; the less faeces are present in the colon, the better the qualitative output of the examination will be. The first phase consists in the physician's identification of the patient's identity and the collection of anamnestic data, possibly consulting previous related investigations and evaluating the correctness of the indication of the examination itself. Anesthesia or sedation are not required, except for in special cases. Sometimes, for non-cooperative children, it may be necessary to use equipment suitable for the child's age (tape, foam pillows, sand bags) to perform an exam correctly (preventing movement and the repetition of the exam) and in a safe manner (avoiding falls). Sometimes it may be required for a parent to collaborate, who, wearing the lead coat, will remain next to the child for the full duration of the exam. The little patient is made to lie down in left lateral decubitus with bent thighs and legs, introducing a latex rectal probe with a diameter of 2.7 and a length of 20 cm, equipped with a balloon that can be inflated as needed. The examination can be carried out by means of air insufflation or, if necessary, for newborns (or pediatric patients up to 4 years of age) they use Gastrografen, belonging to the category of water-soluble, nephrotropic, high osmolar radiological contrast media, in different proportions, depending on the weight of the little patient. The quantity used in the vast majority of cases is 300 ml, therefore 3 bottles, diluted with 200 ml of water. The use of Gastrografen is mainly indicated when the use of barium sulphate is inadequate or contraindicated, or when the results are unsatisfactory. In particular, it is used in cases where partial or total stenosis is suspected or if there is risk of perforation. (Fig.4) The pressure of the fluid or air pushes the invaginated intestine into its normal position, solving the problem. First of all, the device with which you must interface is a remote-controlled orthoclinoscope, initially in a horizontal position, which allows you to perform translation and rotation movements. The examination is performed under fluoroscopic guidance, using

Fig. 2 - Acquisitions without contrast medium in antero-posterior in pediatric patient with strong intestinal distension, in figure "a" you can see an endorectal probe.

Fig.3 - RX addome del PZ pediatrico Pediatric abdomen x-ray.

Fig.4 - Representation of different projections of the pediatric abdomen following the administration of water-soluble contrast medium showing the resolution of ileocecal intussusception.

pulsed fluoroscopy in order to considerably reduce the radiation to the patient, fully respecting the optimization principle and obtaining a real time image. Various panoramic and targeted radiograms are performed to document the various sections of the colon under examination, at the discretion of the radiologist. The TSRM instead will be the delegate to the practical activity, modifying the patient's decubitus and tilting the X-ray tube, in order to obtain qualitatively diagnostic and optimal images. In the cases dealt with, a 1m DFR and an AEC were used with optimum parameters that are around 60 Kv and 125 Mas.

It is always documented:

- the rectal ampoule in lateral and frontal projection, without balloon
- the sigma, with incidence of the vertical and caudo-cranial bundle
- the right and left flexures
- the caecum, possibly with the last ileal loop
- In addition, two panoramic radiographs are taken with the table tilted in Trendelenburg
- with patient supine and perpendicular X-ray tube
- with patient prone and cranio-caudal incidence of the bundle.

Fig. 5 - Direct x-ray of the abdomen of the pediatric patient in supine decubitus position without contrast medium performed at the Rimini Infirmary Hospital.

Fig.6 - Performing the examination in AP with a pediatric patient in supine decubitus after administration of water-soluble contrast medium for evaluation of intestinal transit. Examination carried out at the Rimini Sick Hospital.

Fig. 7 - Assessment of the distribution of contrast medium in intestinal transit and study of any invagination. Examination carried out at the Rimini Sick Hospital.

It is not certain that if the survey has been completed, a 100% success will be obtained, there is a possibility that after treatment intussusception may recur within 24 hours. For this reason, after the bowel has been reduced, the baby will be kept in the hospital for an extra day to make sure there is no recurrence. When enema does not solve the problem, surgery is required.

Any complications / risks resulting from the investigation:

In our experience, the possible damages related to this examination are rare. Occasionally intestinal spasms may occur, causing abdominal pain. Rarely, especially in cases where intestinal intussusception has lasted for many hours, intestinal perforation and peritonitis may occur.

CONCLUSIONS

In conclusion, it can be said that the resolution of intussusception occurs successfully in most cases through an enema, a treatment modality that has significantly improved the outcome of this condition. This therapeutic intervention is economical, safe and effective. In the event that through a first attempt of nonsurgical reduction of intestinal intussusception only a partial reduction is achieved, in a clinically and hemodynamically stable patient, the subsequent repetition of the enema (30-60 minutes after the previous one) allows to obtain complete resolution of the intussusception up to 50% of cases. This method allows to avoid surgery and to adopt a conservative treatment.

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