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Contribution of anorectal air manometry in children

Ndayikeza Longin, Serraj Ilham, Salihoun Mouna, Acharki Mohammed, Kabbaj Nawal
Department of Digestive Functional Exploration-Hepato gastroenterology,
Ibn Sina University Hospital Center of Rabat-Morocco
No conflict of interest.

Abstract
Anorectal Manometry (MAR) is an examination that analyzes the two main functions of the anorectal region, continence and defecation. This exploration is necessary in functional anorectal pathology: constipation and fecal incontinence. The MAR is becoming an increasingly used examination in children of all ages.
The aim of our work is to determine the indications of anorectal manometry (MAR) and to evaluate its contribution in children in our practice.
Materials and methods
This is a retrospective study over a period of 38 months, (January 2017-February 2020), were included 120 children who have benefited from a MAR with AIR system, in our service.
Epidemiological, clinical and manometric data were collected from the archives of the department and from the patients' files; and a data collection form was designed.
Results
Of the 120 patients included, 78 were boys (65%) and 42 were girls (35%) with a sex ratio of 1.8. The average age was 8 years (2 months to 17 years).76 patients (63.3%) complained of encopresis, 34 children (28.3%) had constipation, and 10 children (8.3%) had both. In the 86 children with encopresis, the MAR showed isolated abdominal-pelvic asynchrony in 48 cases (55.8%), isolated poor anal contraction in 10 cases (11.8%), and the combination of 02 in 28 patients (32.5%). Among the 44 patients suffering from constipation, the MAR found 32 cases (72.7%) of abdomino-pelvic asynchronism, 10 cases (22.7%) of mega rectum and a Hirschsprung's disease in 02 children (4.5%).
Conclusion
The MAR with AIR system remains the reference test in the exploration of terminal constipation and encopresis in children. It allows a faster and more accurate diagnosis and to guide an adequate therapeutic management such as biofeedback rehabilitation.
Key words: *Anorectal manometry, Constipation, Encopresis, Child*

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I. Introduction

According to the World Health Organization (WHO), childhood is defined as a period of human life from birth to 18 years. Anorectal pathologies are frequent in the pediatric age and represent a group of affections whose clinical forms and their management are relatively unknown to the general public. These pathologies, of very variable nature and severity, are only exceptionally life threatening; they are nevertheless likely to cause a handicap with heavy consequences on the quality of life of the little patient and his family, especially in case of fecal incontinence with as a consequence the occurrence of fecal soiling in the underwear [1,2].

The study of the anorectal function, i.e. continence and defecation, requires very specialized complementary examinations of varying complexity in order to diagnose disorders of these functions: anal incontinence, terminal constipation, disorders of pelvic statics, and even essential anorectal pain.

It involves questioning and a careful proctological examination, evoking in particular skin sensitivity, sphincter tone at rest and voluntary contraction, the quality of the voluntary thrust and its possible consequences on the pelvic floor [3,4].

MAR is a reference examination, simple, rapid, easy to access, allowing an evaluation of the functional qualities of the rectal reservoir. It allows the study of the motor phenomena of this region, namely the search for the inhibitory recto-anal reflex, the study of the sphincter apparatus, the evaluation of the spontaneous activity of the rectum, as well as the sensitivity thresholds of the latter. It thus allows a functional approach of the affections of the lower digestive tract: Hirschsprung's disease, constipation, encopresis and the postoperative

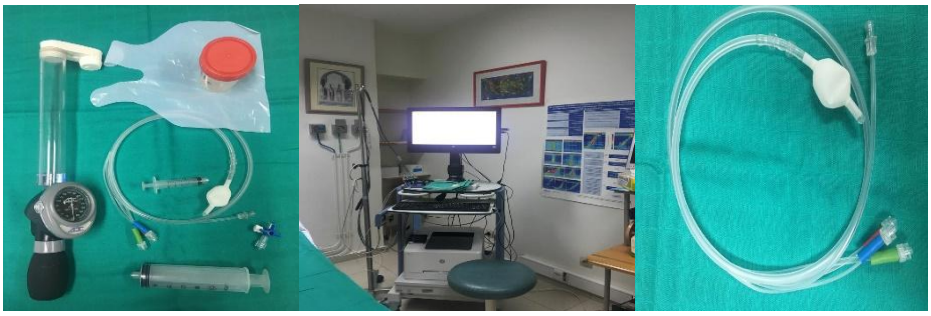
evaluation of continence and aims to highlight the mechanism of the dysfunction and to propose a therapeutic solution [5,6,7].

The aim of our work is to determine the indications of MAR and to evaluate its contribution in children in our practice.

II. Materials And Methods

This is a retrospective study concerning 120 children aged 0-18 years collected in the Department of Digestive Functional Exploration at the Ibn Sina Hospital Center in Rabat, during the period of 38 months (January 2017- February 2020). All included children benefited from a MAR with Air system. The analysis of the different parameters of the MAR was performed using MMS 9.5 software. Resting pressure, voluntary anal contraction, pushing effort, anorectal reflexes (RRR-RRAI-RRAE) and maximum tolerable volume were analyzed.

RRR=Recto-Rectal Reflex
RRAI= Recto-Anal Reflex Inhibitor
RRAE= Excitatory Recto-Anal Reflex



Material of MAR of the department of Digestive Functional Exploration of the Ibn Sina Hospital

III. Results

The mean age of our patients was 8 years with extremes ranging from 2 months to 17 years. There were 78 boys (65%) and 42 girls (35%) with a sex ratio of 1.8.

76 patients (63.3%) complained of encopresis, 34 children (28.3%) had constipation, and 10 children (8.3%) had both. In the 86 children with encopresis, the MAR showed isolated abdominal-pelvic asynchrony in 48 cases (55.8%), isolated poor anal contraction in 10 cases (11.6%), and the combination of 02 in 28 patients (32.5%).

Among the 44 patients suffering from constipation, the MAR found:32 cases (72.7%) of abdomino-pelvic asynchronism,10 cases (22.7%) of mega rectum and Hirschsprung's disease in 02 children (4.5%). Nine children had an indication for biofeedback treatment.

Table I. Indications for MAR

Indications	Number of cases	Percentage (%)
Encopresis	76	63,3
Constipation	34	28,3
Encopresis + Constipation	10	8,3

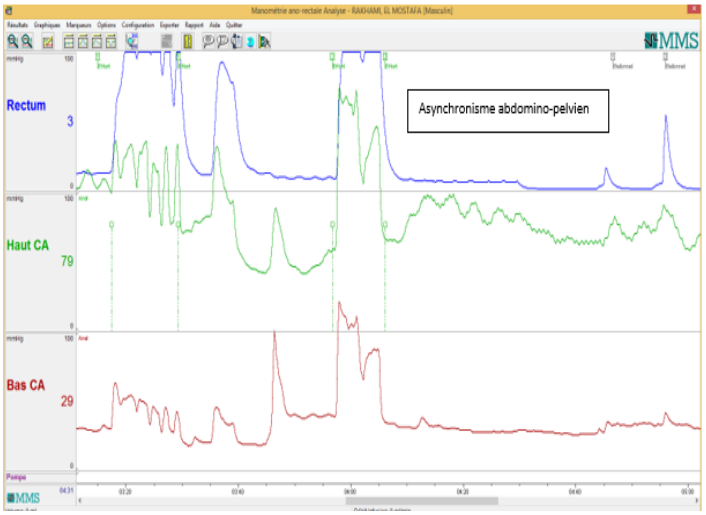
Encopresis represents the most frequent indication for anorectal air monometry in children with 63,3%.

Table II. Results of the MAR

Indications	Results of the MAR	Number of cases	Percentage (%)
Encopresis	AP asynchronism	48	55,8
	Bad anal contraction	10	11,6
	AP asynchrony +Poor anal contraction	28	32,5
Constipation	AP asynchronism	32	72 ,7
	Mega rectum	10	22,7
	Hirschsprung's disease	2	4,5

AP= Abdominal-pelvic Asynchronism

Abdominal-pelvic asynchronism is the most common cause of constipation and encopresis in children.



Manometric tracing showing abdomino-pelvic asynchrony
(The computer of the used service is configured in French)

IV. Discussion

In principle, the aim of anorectal manometry is to obtain objective elements concerning anorectal physiology. It consists in recording pressures in the rectal cavity, in the upper part of the anal canal and in the lower part of the anal canal [8]. The pressures are recorded without any stimulation while the patient is at rest, relaxed and calm, and then during voluntary anal contraction and during the effort of pushing [9].

The examination is painless, safe, and can be performed from birth as it is limited to the search for the RRAI (Reflexo Anal Inhibitor) which is an essential element allowing the integrity of the intrinsic innervation to be verified [10].

The examination can be performed in an incomplete way, especially in the neonatal period, and in a more complete way as soon as the child is able to participate actively beyond the age of 5 years [10,11].

The average age of our patients was 8 years with extremes ranging from 2 months to 17 years. The MAR has a place of choice in the exploration of functional anorectal disorders after a careful history and physical examination to find the origin of the disorders presented by the patient.

In neonates and infants with major constipation, the MAR allows to search for the RRAI whose absence constitutes the element of the manometric diagnosis of Hirschsprung's disease [12]. In children and adolescents, it is indicated:

- In cases of chronic terminal constipation not responding to usual treatments and dietary measures.
- In cases of chronic constipation complicated by encopresis
- In case of neurological anal incontinence, for example in the case of a spina bifida type malformation

MAR can guide the treatment of anal incontinence and terminal constipation through perineal rehabilitation [13,14]. A review of the scientific literature published in 2004 concluded that biofeedback could be effective in many situations of constipation, especially in children.

A study of 43 children demonstrated the superiority of conventional medical care combined with biofeedback. After 7 months, 55% of the children in the experimental group had symptom resolution compared to 5% in the control group, and after 12 months, 50% and 16% respectively; for normalization of defecation movements, the rate was 77% versus 13% [15]. In 2009, a meta-analysis concluded that biofeedback in the treatment of constipation was superior to the use of other treatments such as laxatives or botox [16].

In our study, the main indications were represented by encopresis (63.3%) of cases followed by constipation (28.3%), 8.3% of cases had a combination of encopresis and constipation. In a study on MAR in children in Fez [5], the indications for MAR in children are: constipation 58.10% of cases, encopresis in 12.20% of cases, the association of the two in 24.40% of cases and 5.10% of cases of anorectal malformations. Our results are similar to those of the study of the Department of Digestive Functional Exploration of Ibn Sina Hospital in 2015, in relation to the indications of MAR in children: encopresis (51.6%) of cases, constipation (27.5%) of cases and 13.6% of cases for patients complaining of the association of encopresis and constipation [17].

Constipation is very frequent in children; it can be isolated or associated with encopresis. The physiological mechanisms are complex, combining psychological and motor factors. The MAR allows us to measure the muscular strength of the anal sphincter, the capacity and sensitivity of the rectum, and the possibilities of evacuating stools [18,19,20].

In our study, the results of the MAR were abdomino-pelvic asynchrony (55.8%), poor anal contraction (11.6%) and a combination of both in 32.5% of cases; while in the case of constipation

abdomino-pelvic asynchronism predominates in 72.7% of cases followed by mega rectum (22.7%) of cases and Hirschsprung's disease in 4.5% of cases.

A retrospective comparative study conducted at the Gastroenterology Department of Charles-Nicolle Hospital in 2012 collating all children who had received an MAR in the context of exploration of encopresis and/or constipation showed a higher frequency of abdomino-perineal dyssynergia and weak voluntary contraction in patients with encopresis that may reflect an imbalance in the neuromuscular control of defecation in constipated children with encopresis [21].

Our results are similar to those found in the study on indications and results of MAR in children in 2015 [17]: in children with encopresis, abdomino-pelvic asynchrony is represented in 53.4% of cases, poor anal contraction in 5% of cases, and the combination of both in 28.1% of cases. For children with constipation,56.3% of cases had abdomino-pelvic asynchronism, mega rectum (7.1%) of cases and Hirschsprung's disease at 3.6% of cases.

In a study on Anorectal Manometry in children conducted in Fez in 2012, we found as results of MAR in children in favor of: abdomino-pelvic asynchronism (54.1%) of cases, Hirschsprung's disease (25 ,5%) of cases, a mega rectum (8.1%) of cases; and the MAR was normal in 4.1% of cases [5].

V. Conclusion

MAR with AIR system remains the "hub" in the exploration of terminal constipation and encopresis in children. Abdominal-pelvic asynchrony was the most frequent abnormality. In addition to the precise diagnosis of the anorectal functional disorder, air manometry allows a more adapted therapeutic orientation, particularly by biofeedback.

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