pH-metry in children: Moroccan experience

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ABSTRACT

Ambulatory pH-metry has long been one of the main diagnostic tools used for the diagnosis of gastroesophageal reflux disease (GERD) in adults and is also increasingly used in children. The aim of this study is to describe the clinical data of children, the indications and results of pH-metry in a Moroccan unit. Methods: Over five years, 78 children underwent pH-metry in our unit. We analyzed their clinical data and their examination results. Results: 78 children underwent pH-metry were included. 48.7% are boys and 51.3% are girls. The mean age is 8.2 years (2-17 years). 53 pH-metry (78.2%) were realized in children with respiratory symptoms. Other indications are represented by assessment of GERD in 8 patients, vomiting in 4 patients and ear-nose-throat symptoms in 3 patients. The mean recording time was 23 hours. 28 patients (35.9%) were diagnosed with GERD and 49 patients (62.8%) had a normal pH-metry. For patients with GERD, the mean time with reflux was 156.7 minutes and average EAO was 9.1%. It was noted a diurnal and nocturnal GERD in 10 cases (35.7%), a diurnal GERD in 10 cases (35.7%) and a nocturnal GERD in 8 cases (28.6%). The respiratory symptoms were the main indication of pH-metry represented in 61 children (78.2%). 34.4% had a pathological GERD with a mean De Meester index of 37.3. Conclusion: Ambulatory esophageal pH monitoring is the "gold standard" for diagnosis of acid GERD. In our series, pH-metry assess the diagnosis of pathological GERD in a third of children with respiratory symptoms.

Key words: pH metry, GERD, Children

INTRODUCTION

Gastroesophageal reflux is a common occurrence in children, but its pathophysiological importance varies greatly upon the age of the child. Normal infants regurgitate frequently. Acid reflux is much less common in adolescents, and should be considered abnormal. Symptoms of gastroesophageal reflux disease (GERD) are common in infants. It is often difficult to discriminate between physiological and pathologic gastroesophageal reflux, although this discrimination is essential to determine which infants to evaluate and treat.

Regurgitation is a common phenomenon during the first year of life. GERD should be suspected if the regurgitating infant has one or more other symptoms such as crying, fussing or arching back, refusal to feed, failure to thrive or hematemesis. However, most of these phenomena (except failure to thrive and hematemesis) occur in healthy infants.

Ambulatory pH-metry has long been one of the main diagnostic tools used for the diagnosis of GERD in adults and is also increasingly used in children.
METHOD
PH-metry involves passing a small flexible tube through the nose into the esophagus and stomach. The degree of acid refluxed into the esophagus can be measured. The standard duration of recording for esophageal pH testing is 24 h.

The pH electrode must be calibrated before and at the end of each study. Calibration is performed with both acidic and neutral buffer of known pH (usually pH 4 and 7).

The catheter based pH electrodes are by convention positioned 5 cm above the proximal border of the lower esophageal sphincter. The probe is connected to a battery-powered data collector (Figure 1). By altering the position of the recording device, the machine can record acid reflux episodes as occurring in either the upright or recumbent position. Meals and symptoms are recorded by pushing event marker buttons on the data recorder. A normal diet can be consumed during the 24 h. All patients undergoing the test are given a list of instructions. For children, in our unit, it requires the presence of the parents to explain these measures that are necessary for the interpretation of pH metry. The parents are instructed to record the symptoms such as heartburn, regurgitation, cough and wheezing, on the pH record at the time they occur. They are asked to note on the pH record the time their kids start and finish eating, or when they have a drink. They are asked to remain upright while awake and flat only while sleeping. While upright, patients are allowed to sit in a chair, stand up, or walk about within the length of the leads of the machine. With their parents, they are instructed to be sure to write down their changes in position on the pH record.

The pH-monitoring recordings were uploaded into a hospital computer at the end of the recording time and were analyzed using the MMS® software package.

The parameters that are evaluated during analysis of these 24 hours pH record include:
- The total record period, (diurnal and nocturnal record)
- The number of reflux per 24 hours,
- The esophageal acid exposure (EAO) is the percentage of time lower esophageal pH≤4
- The diurnal and nocturnal GERD
- The De Meester index

Of these, EAO is the most important parameter. GERD is defined by EAO >5%. Of these 61 tests were realized for respiratory symptoms which were the main indication, distributed as follows: asthma or wheezing in 29 cases (37.2%), recurrent pneumonia in 18 cases (23.1%), 6 cases of chronic cough (7.7%), 5 cases of bronchiectasis (6.4%), dyspnea in 2 cases (2.6%) and 1 case for apnea (1.3%). All patients were seen by a pediatric pulmonologist before being considered for reflux testing.

Figure 2: Indications of pH-metry in children

RESULTS

CLINICAL DATA OF PATIENTS
Over five years, all patients ages between 2 and 17 years referred to perform a pH-metry in our unit were included. There were seventy eight children, 38 (48.7%) were boys and 40 (51.3%) were girls with sex ratio = 0.95. The mean age was 8.2 years (2-17 years).

The indications of the pH-metry were analyzed (Figure 2), 61 tests were realized for respiratory symptoms which were the main indication, distributed as follows: asthma or wheezing in 29 cases (37.2%), recurrent pneumonia in 18 cases (23.1%), 6 cases of chronic cough (7.7%), 5 cases of bronchiectasis (6.4%), dyspnea in 2 cases (2.6%) and 1 case for apnea (1.3%).

The GERD can be suspected also for the ear-nose-throat symptoms found in 3 cases (3.8%).

The others indications were peri-oral cyanosis in 1 case (1.3%), one patient had this test after hiatal hernia surgery (1.3%).

PH MEASUREMENT
The standard duration of recording for esophageal pH testing is 24 h. In our study, the mean recording time was 23 hours (13 – 26 hours).

49 out of 78 pH-metry were normal (62.8%). One child was too excited and the recording was inconclusive, we didn’t include this test.

28 patients (35.9%) were diagnosed with GERD (Figure 3). The mean time with reflux was 156.7 minutes. Average EAO was 9.2% with a mean De Meester index of 39. It was noted a diurnal and nocturnal GERD in 10 cases (35.7%), a diurnal GERD in 10 cases (35.7%) and a nocturnal GERD in 8 cases (28.6%) (Figure 4).
The respiratory symptoms were the main indication of pH metry in children (78.2%), asthma or wheezing were found in 37.2%. pH metry assess the diagnosis of pathological GERD in a third of children with respiratory symptoms.

Claude Thilmany conducted a study investigating 24-h recordings of concurrent intra-esophageal pH and impedance in patients suffering from chronic pulmonary disease and not treated by antacid medication. The study clearly confirmed that pathological gastro-esophageal refluxes are common in all age groups, infants, children and adolescents, with chronic pulmonary diseases. Their data showed that non-acid refluxes only play a minor role in these children, because they were very infrequent.

To our knowledge, there is the first study investigating 24 hour esophageal pH monitoring in children in Morocco. Our study showed that 35.9% of our patients were diagnosed with GERD, the third of these children had respiratory symptoms.

ACKNOWLEDGMENTS

Nothing to declare.

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