

Role of radiography and ultrasonography in the diagnosis of the pediatric gastro-esophageal reflux disease

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Abstract. – Twenty-four hour esophageal pH-monitoring is gold standard for evaluate pathological GERD. Role of radiography and ultrasonography in the diagnosis of gastro-esophageal reflux disease (GERD) has been studied. Our results have been shown that radiography and ultrasonography have a limited role in the diagnosis of pathological GERD. However, such investigations are useful the follow-up of patients affected by pathological GERD.

Key Words:

Gastro-esophageal reflux, Radiography, Ultrasonography.

Patients and Methods

Actually was undertaken between January 1999 and January 2001 of a population consistent of 29 patients with an average age of 37 months (2 months to 6 years). Fifteen patients had vomiting and/or severe regurgitation, twelve had respiratory symptoms, two patients had symptoms suggesting Sandifer's syndrome. All the patients underwent 24-hour esophageal pH-monitoring. Twelve patients underwent UGIS (Figure 1) and fifteen underwent US (Figure 2).

Introduction

Gastro-esophageal reflux (GERD) is defined as the involuntary passage of gastric contents into the esophagus. GERD is a physiological event in adults and children but becomes pathological when the intensity and/or frequency increases. GERD is characterized by pathological GERD with related symptoms. Twenty-four hour esophageal pH-monitoring is the "gold standard" in the investigation of suspect pathological GERD¹. Upper Gastrointestinal Series (UGIS) has been the preferred method to visualize clinically suspected GERD, because this method was the first to be a routinely available investigation. Recently, ultrasonography (US) has been proposed to study GERD since US as a no invasive diagnostic test.

Results

Twelve patients had pathological esophageal pH-monitoring, seven patients had pathological UGIS and ten patients had pathological US.

When continuous 24-hour esophageal pH-monitoring was taken as the reference test, UGIS had a sensitivity 65% and a specificity 40%, with a positive predictive value of 10-15% and a negative predictive value of 22%.

When continuous 24-hour esophageal pH-monitoring was taken as the reference test, US had a sensitivity 80% and a specificity 50%, with a positive predictive value of 15-18% and a negative predictive value of 71%.

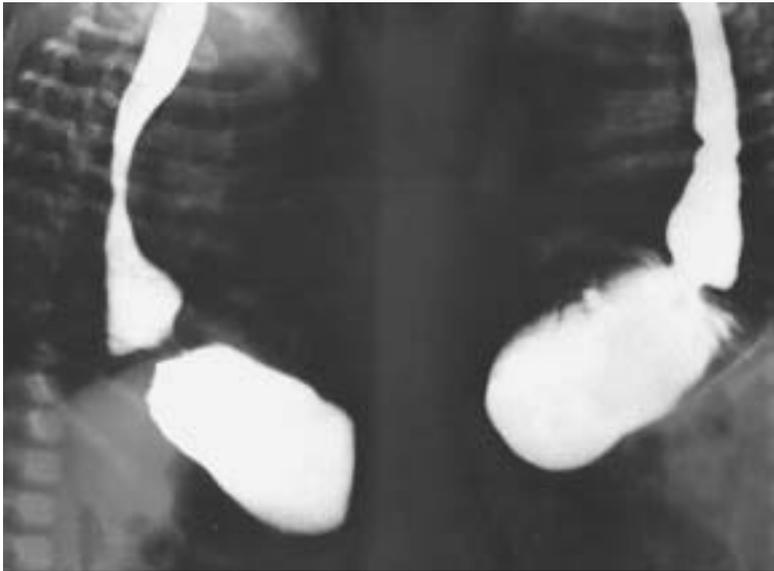


Figure 1. Barium meal: severe gastro-esophageal reflux, with presence of thickened esophageal folds and sliding hernia.

Discussion

In our study, the sensitivity of the radiological method for demonstrating pathological GERD has been 65%. Such results are in agreement with Aksglaede et al², who found sensitivity 52%; with Madsen et al³, who found sensitivity 78%; and with Aksglaede et al⁴, who found sensitivity 29% in infants less than 1 year old. In our study the specificity of the radiological method has been 40%. Such results are in agreement with Aksglaede et al⁴, who found specificity 50% in infants less than 1 year old.

In our study, the sensitivity of US method for demonstrating pathological GERD has been 80%. Such results are in agreement with Milocco C et al⁵, who found sensitivity 82%. In our study the specificity of US has been 50%. Such results are in agreement with Milocco C et al⁵, who found specificity 45%; and Lazzari R et al⁶, who found specificity 58%.

GERD episodes are common in infants, children and adults. It is well known that, in infants, 99 GERD daily episodes are physiological and, in children as well as in adults, 47 GERD daily episodes are normal¹. UGIS and



Figure 2. Ultrasound of gastro-esophageal junction. Severe gastro-esophageal reflux with short esophagus.

US are performed in a short period of time: it is not surprising that both the investigations have low sensitivity and specificity. Therefore both the investigations have a minor role in the diagnosis of pathological GERD. However, UGIS and US play a key role in the study of infants and children affected by pathological GERD. UGIS is useful for differential diagnosis and for detecting associated disorders: UGIS is the best way for detecting anatomical malformations (which can cause pathological GERD) as well as swallowing disorders (which can be associated to pathological GERD) (Figure 1). US has a key role in the detecting gastric emptying time. It is well known that delayed gastric emptying time can play an important role in the pathophysiology of GERD (Figure 2). The conventional tools for assessing the motility are either invasive (e.g., manometry) or very expensive and time-consuming (e.g., scintigraphy): US of gastric antrum is a new, sensitive and non-invasive method for assessing gastric motility⁷.

In conclusion, we stress that UGIS and US have a minor role for detecting pathological GERD. Therefore it is not useful to perform such investigations on infants and children affected by symptoms GERD related. UGIS and US are useful in the follow-up of patients affected by GER, in order, to investigate anatomical causes of GERD as well as gastric emptying time.

References

- 1) VANDENPLAS Y. Oesophageal pH monitoring for gastro-oesophageal reflux in infants and children. Chichester: John Wiley & Sons Ltd, 1992.
- 2) AKSGLAEDE K, FUNCH-JENSEN P, THOMMESEN P. Radiological demonstration of gastroesophageal reflux. Diagnostic value of barium and bread studies compared with hour pH monitoring. *Acta Radiol* 1999; 40: 652-655.
- 3) MADSEN E, AKSGLAEDE K, JACOBSEN NO, FUNCH-JENSEN P, THOMMESEN P. Gastro-oesophageal reflux demonstrated by radiography. A supplement to 24-h pH monitoring. *Acta Radiol* 2001; 42: 521-525.
- 4) AKSGLAEDE K, PEDERSEN JB, LANGE A, FUNCH-JENSEN P, THOMMESEN P. Gastro-oesophageal reflux demonstrated by radiography in infants less than 1 year of age. Comparison with pH monitoring. *Acta Radiol* 2003; 44: 136-138.
- 5) MILOCCO C, SALVATORE CM, TORRE G, GUASTALLA P, VENTURA A. Sonography versus continuous 24 hours oesophageal pH-monitoring in the diagnosis of infant gastroesophageal reflux. *Med Surg Ped* 1997; 19: 245-246.
- 6) LAZZARI R, COLLINA A, PESSION A, CORVAGLIA L, TANI G, SCIUTTI R. Diagnosis of gastro-oesophageal reflux in childhood: comparison between sonography and pH-monitoring. *Med Surg Ped* 1991; 13: 617-620.
- 7) CORRADO G, RIEZZO G, CAVALIERE M, REA P, PACCHIAROTTI C, CARDI E. Gastric emptying time and gastric electrical activity in a child with Sandifer's syndrome. *Acta Paediatr* 1999; 88: 584.