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Impact of diagnostic and interventional endoscopic ultrasonography in children

Larissa Latrilha **GARCIA**[1], Eloy **TAGLIERI**[1], Otávio **MICELLI-NETO**[1] and José Celso **ARDENGH**[1,2,3]

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ABSTRACT – **Background –** Endoscopic ultrasonography is used in the diagnosis and treatment of digestive diseases in adults. In children, its use is limited due to a lack of available expertise. **Objective –** This study aimed to evaluate the clinical impact of endoscopic ultrasonography on diagnostic and therapeutic strategy changes in pediatric patients. **Methods –** Over ten years, this study retrospectively and consecutively analyzed children aged ≤18 years who underwent endoscopic ultrasonography because of inconclusive imaging or laboratory tests. The indications, results, occurrence of adverse events, and clinical impact of the procedures were analyzed. The clinical impact was classified as major (when the findings led to changes in diagnosis and management), minor (change in diagnosis but not in management), or none (no change in diagnosis or management). **Results –** Overall, 107 children [77 (72%) of whom were female; mean age: 11.7 ± 4 years] underwent upper [102 (95.3%)] and lower [5 (4.7%)] endoscopic ultrasonography; 64 (58%) patients underwent diagnostic endoscopic ultrasonography, and 43 (42%) underwent interventional endoscopic ultrasonography. Endoscopic ultrasonography was used to investigate pancreaticobiliary, gastric, rectal, esophageal, duodenal, and mediastinal diseases in 81 (76%), 14 (13%), 5 (4.6%), 3 (2.8%), 2 (1.8%), and 2 (1.8%) patients, respectively. The clinical impact was significant in 81% of the children. Major and no clinical impact on pancreaticobiliary, gastrointestinal diseases, and mediastinal masses occurred in 50 (62%) and 13 (16%), 13 (54%) and 9 (37%), and 2 (100%) and 0 (0%) of the patients, respectively. **Conclusion –** This study evaluated the impact of diagnostic and interventional endoscopic ultrasonography in pediatric patients. When clinically and appropriately indicated, these procedures are safe and effective diagnostic or therapeutic interventions in pediatric patients with gastrointestinal or pancreaticobiliary disorders.

Keywords – Endosonography; pediatrics; fine-needle aspiration/biopsy; gastrointestinal diseases; drainage.

INTRODUCTION

Endoscopic ultrasonography (EUS) is limited in children[1,2]. The first reports of its pediatric use were published in the 1990s[3,4]. In adults, diagnostic EUS (D-EUS) and interventional EUS (I-EUS) are safe and effective and are associated with low rates of adverse events[5,6]. When correctly indicated, EUS helps to avoid unnecessary invasive procedures[7].

According to the criteria of the European Society of Gastrointestinal Endoscopy (ESGE) and the European Society for Pediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN), EUS should be performed to diagnose pancreatic and biliary tract diseases in children with inconclusive findings on abdominal ultrasound (US), computed tomography (CT), magnetic resonance cholangiopancreatography (MRCP), and upper gastrointestinal endoscopy (UGE)[8]. Suspected choledocholithiasis, biliary microlithiasis, pancreatic pseudocysts, and other pancreatic and biliary tract diseases can be confirmed using EUS. Other indications for this procedure in children include congenital esophageal stenosis, eosinophilic esophagitis, gastric varices, subepithelial tumors (SET), extrinsic compression (ExTC), and esophageal, gastric, or duodenal duplication[8]. Because the incidence of gastrointestinal tumors and pancreatic and biliary tract diseases is lower in children, the use of EUS is less common in the pediatric population than in adults[6,7].

With the introduction of equipment specifically designed for pediatric use, there has been a surge in studies in this population[9-12]. D-EUS and I-EUS are performed by gastroenterologists who have conducted these procedures in adults[6,13]. In several case series, D-EUS and I-EUS findings were found to have a substantial clinical impact on the adoption of the best therapeutic strategy for several gastrointestinal diseases[12,14,15]. EUS-guided fine-needle aspiration (EUS-FNA) is not routinely used in children due to concerns regarding adverse events, lack of experienced physicians, and limited published literature[1,2,5,12,14,16-18].

This study presents one of the largest case series of pediatric EUS to date and describes the authors' experience of using D-EUS and I-EUS, particularly the latter, in a center that handles a large volume of procedures. This study aimed to evaluate the clinical impact of D-EUS and I-EUS on diagnostic and therapeutic strategy changes in pediatric patients.

METHODS

The present study was approved by the Research Ethics Committee of the Federal University of São Paulo (UNIFESP; approval number: 028.953/2020). Informed consent was obtained from the children's parents or legal guardians.

This retrospective case series included children aged ≤18 years who were consecutively referred to undergo EUS in the endoscopy unit of the Hospital Moriah in São Paulo, Brazil, over a 10 year

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[1] Hospital Moriah, Serviço de Endoscopia, São Paulo, SP, Brasil. [2] Universidade Federal de São Paulo, Departamento de Diagnóstico por Imagem, São Paulo, SP, Brasil. [3] Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo (HCFMRP-USP), Setor de Endoscopia, Ribeirão Preto, São Paulo, SP, Brasil.
Corresponding author: Larissa Latrilha Garcia. E-mail: larilgarcia@hotmail.com

period (January 2010 – December 2019). Demographic data, symptoms, and imaging results (US, CT, MRCP, and UGE) were obtained. The patients' age and sex, indications for EUS and its findings (location, size, and echogenicity), microhistology results, and adverse events during and after EUS were recorded.

EUS was indicated in the presence of symptoms associated with inconclusive imaging examinations or altered laboratory tests. These findings determined complementation by D-EUS or I-EUS to obtain a more accurate diagnosis and decide on the best treatment strategy.

EUS was performed using either a radial or linear instrument, using standard techniques for each study site[19]. A radial instrument and a linear instrument were used for D-EUS and I-EUS, respectively. Radial EUS provides 360° slices perpendicular to the axis of the device. Linear EUS has an image plane parallel to the axis of the device, providing oblique images at a 120° – 180° angle, which allows fine-needle biopsies and therapeutic procedures to be performed. A minimum of 10–12 h of fasting was required for both D-EUS and I-EUS. Lower D-EUS required fasting and preparation with mannitol at 10 mL/kg body weight, up to a maximum volume of 500 mL diluted in strained orange or lime juice. Children aged ≤15 years received general anesthesia and were intubated with assisted ventilation, if required, at the anesthesiologist's discretion because this medical specialty is available at the study hospital. Those aged >15 years received conscious sedation with an intravenous combination of midazolam (0.05–0.1 mg/kg/dose), pethidine (1–1.5 mg/kg/dose), fentanyl (2 µg/kg/dose), and/or propofol (0.02–1 mg/kg/dose) under appropriate cardiorespiratory monitoring[20]. All procedures were performed under the supervision of a gastroenterologist trained to treat adults (JCA, who has over 25 years of experience in performing D-EUS and I-EUS) according to the ESGE/ESPGHAN criteria, which recommend the use of EUS in children exclusively in tertiary referral centers with experience in advanced endoscopic therapy[8].

Diagnostic EUS

D-EUS was limited to the insertion of a radial or linear EUS probe to acquire ultrasound images and facilitate the diagnosis of gastrointestinal diseases[17]. In children aged ≤15 years, the procedure was performed using a radial instrument with a forward endoscopic view. Miniprobes, which are typically inserted into the working channel of conventional forward-viewing endoscopes, were not used in any of the patients in the present case series.

Interventional EUS

I-EUS encompasses EUS-FNA, EUS-guided drainage (EUS-D), and EUS-guided celiac plexus neurolysis (EUS-CPN). All procedures were performed according to a standard protocol for adults. All EUS-FNA procedures were performed as per the conventional technique using a 10 mL syringe attached to an aspiration needle. EUS-D was performed by placing a metal or plastic stent to drain the collected fluid. EUS-CPN included the injection of absolute alcohol (20 mL) into the region adjacent to the origin of the celiac trunk from the aorta[19,21,22].

Microhistology analysis obtained by EUS-FNA

The specimens were immersed in 10% formaldehyde for microhistological analysis after centrifugation. All specimens were examined by a single pathologist who was experienced in analyzing pancreatic tumor biopsies obtained by EUS[23].

Clinical impact

The clinical impact was classified as major when the findings led to changes in both diagnosis and management; minor when the findings led to a change in diagnosis but not in management, and none when the findings led to no change in either diagnosis or management[15].

Statistical analysis

The collected data were stored in Excel spreadsheets, and statistical analysis was performed using Stata 14. Continuous variables were expressed as means and standard deviations, whereas dichotomous variables were expressed as simple proportions. The sensitivity, specificity, positive and negative predictive values, and accuracy of EUS-FNA in the accurate diagnosis of tumors that required cell or tissue specimens were calculated.

RESULTS

US, CT, MRI, and UGE examinations were performed prior to EUS in 78 (73%), 62 (58%), 41 (38%), and 19 (18%) patients, respectively. Cancer antigen 19.9, carcinoembryonic antigen, amylase, and lipase tests were requested in 8 (8.3%), 7 (7.4%), 38 (35.8%), and (38) 35.8% of children, respectively. All cases with abnormal findings on imaging or laboratory tests associated with symptoms were considered to have an indication for EUS.

Overall, 107 patients aged ≤18 years (mean age 11.7±4 years; range 5–18 years; 77 (72%) girls) underwent upper (102) and lower (5) EUS. Indications were pancreatic and biliary tract diseases, gastrointestinal disorders, and mediastinal masses in 81 (76%), 24 (22%), and 2 (2%) cases, respectively (TABLE 1). The chief indications for performing EUS were abdominal pain (25.2%), recurrent acute pancreatitis 19 (17.7%), differential diagnosis between SET and ExTC 17 (15.8%), and pancreatic mass (cystic or solid) 15 (14%). Furthermore, 64 (58%) and 43 (42%) patients underwent D-EUS (EUS-FNA, 33; EUS-D, eight; and EUS-CPN, two).

TABLE 1. Demographic characteristics of children submitted to the EUS.

No of children	107
Female/male	77/30
Average age ± SD, (min-max)	11.7±4 (5–18)
Organ studied in (%)	
Biliopancreatic	81 (75.7)
Gastrointestinal- upper and lower	24 (22.4)
Stomach	14 (13)
Rectum	5 (4.6)
Esophagus	3 (2.8)
Duodenum	2 (1.8)
Mediastinal	2 (1.8)
Mediastinum	2 (1.8)

SD: standard deviation; EUS: endoscopic ultrasonography.

Diagnostic EUS

EUS was performed in 81 patients (76%) to evaluate pancreaticobiliary diseases. The indications included acute pancreatitis (recurrent or not), suspected biliary obstruction, pancreatic alterations detected by US, CT, or MRCP, and upper abdominal pain of suspected pancreas or biliary tract origin without a conclusive diagnosis by imaging methods (TABLE 2). Indications for the evaluation of gastrointestinal diseases included alterations of the esophagus, stomach, duodenum, and rectum (TABLE 3). EUS was used to evaluate the gastrointestinal tract in 24 patients (upper and lower tracts: 19 and five patients, respectively).

Three patients underwent D-EUS of the esophagus to differentiate between SET and ExTC. The final diagnoses confirmed by EUS-FNA were Abrikossoff's tumor (one case), leiomyoma (one case), and duplication cyst (one case).

EUS of the stomach (14 patients) was indicated for differential diagnosis between SET and ExTC (12 cases), abdominal pain (one case), and suspected gastric lymphoma (one patient). The final diagnoses were ExTC (four cases), ectopic pancreas (four cases), leiomyoma (three cases), and gastrointestinal stromal tumors (one case). The EUS image of the patient with abdominal pain was compatible with non-Hodgkin lymphoma, which was later confirmed using EUS-FNA, whereas the suspected case of gastric lymphoma was not confirmed by EUS, which had normal results.

TABLE 2. The relation with the diagnosis before and after EUS in biliopancreatic disease.

Pre-EUS diagnosis	N (%)	Post-EUS diagnosis, N.
Abdominal pain	25 (32)	MCL, 8; NL, 8; CHLT, 4; MCL+ CHLT, 1; CP, 2; p-NET, 1; PostC, 1.
Recurrent acute pancreatitis	19 (23.4)	MCL, 4; CHLT, 3; CP, 3; IN, 2; NL, 2; HP, 1; IAP, 2; PP, 1; SCA, 1.
Pancreatic cyst/mass	15 (18.5)	AIP, 3; SPN, 3; LY, 2; p-NET, 2; IPMN, 1; MCL, 1; PP, 1; SCA, 1; TH, 1.
Choleasthasis	6 (7)	CC, 2; AP, 1; CP, 1; NL, 1; p-NET, 1.
Hypoglicemia	5 (6.2)	p-NET, 4; NL, 1.
Abdominal blunt trauma	3 (3.7)	PP, 3.
Chronic pancreatitis suspicious	2 (2.5)	CP, 2.
Enlargement of pancreas	2 (2.5)	CP, 1; p-NET, 1.
Wallet off necrosis	2 (2.5)	WON, 2.
Elevated CA 19.9	1 (1.2)	NL, 1.
Duodenal Bulging	1 (1.2)	CC, 1.

AIP: autoimmune pancreatitis; AP: acute pancreatitis; CC: choledocal cyst; CHLT: cholesterolosis; CP: chronic pancreatitis; HP: hereditary pancreatitis; IAP: idiopathic acute pancreatitis; IN: inflammatory nodule; IPMN: intraductal papillary mucinous neoplasia; LY: lymphoma; MCL: microlithiasis; MCL + CHLT: microlithiasis + cholesterolosis; MD: main duct dilatation; NL: normal; p-NET: pancreatic neuroendocrine tumor; PostC: post cholecystitis; PP: pancreatic pseudocyst; SCA: serous cystadenoma; SPN: solid-pseudopapillary neoplasia; TH: teratoma; WON: wallet-off necrosis; EUS: endoscopic ultrasonography.

TABLE 3. The relation with the diagnosis before and after EUS in gastrointestinal disease.

Pre-EUS diagnosis	N (%)	Post-EUS diagnosis, N.
Abdominal pain	2 (8.3)	LY, 1; DU, 1.
Diferential Diagnosis SET X ExtC	17 (70.8)	EP, 4; GL, 3; GSC, 3; AB, 1; DL, 1; EDC, 1; EL, 1; GC, 1; GIST, 1; SOC, 1.
Anal pain	2 (8.3)	AF, 1; AS, 1.
Fecal incontinence	2 (8.3)	AS, 1; NL, 1.
Gastric lymphoma suspicious	1 (4.2)	NL, 1.

AB: abrikossoff; AF: anal fistula; AS: anal abscess; DL: duodenum leyomioma; DU: duodenal ulcer; EDC: esophageal duplication cyst; EL: esophageal leyomioma; EP: ectopic pâncreas; ExtC: extrinsec compression; GC: gallbladder compression; GIST: gastrointestinal estromal tumor; GL: gastric leyomioma; GSC: gastric splenic compression; LY: lymphoma; NL: normal; SET: subepithelial tumor; SOC: simple ovarian cyst; EUS: endoscopic ultrasonography.

The indications for EUS of the duodenum were abdominal pain (one case) and differential diagnosis between SET and ExTC[1]. A duodenal ulcer was confirmed by radial D-EUS in a patient with abdominal pain, and a leiomyoma was confirmed by EUS-FNA in a patient with duodenal bulging.

The indications for rectal EUS were fecal incontinence (two cases), anorectal pain (two cases), and differential diagnosis between SET and ExTC[1]. One of the patients with fecal incontinence had no history of prior surgery, and EUS showed that the anal canal muscles were absent, while the other patient had a history of perineal surgery, and EUS showed a normal anal canal. Both patients were referred for clinical follow-up. The two patients with pain were diagnosed by EUS to have abscesses: one perianal abscess with a fistula and one perirectal abscess. EUS-D was performed in both cases. In the single case of differential diagnosis between SET and ExTC, a single giant cyst in the left ovary was confirmed after surgical excision.

The two indications to evaluate mediastinal masses were confirmed by EUS-FNA to be thymoma and leiomyoma of the esophageal wall.

Interventional EUS

EUS-FNA was performed in 33 (31%) patients. The indications were cystic or solid pancreatic masses (12 cases), differential diagnosis between SET and ExTC (seven), hypoglycemia (four), recurrent acute pancreatitis (three), jaundice (two), abdominal pain (two), mediastinal masses (two), and enlarged pancreas (one). The microhistological results were inconclusive in 4 (12.2%) patients. In the remaining 29 (87.8%) patients, an appropriate diagnosis was made: non-functioning pancreatic neuroendocrine tumor (six cases), insulinoma (three), leiomyoma (four), autoimmune pancreatitis (two), solid pseudopapillary neoplasm (two), inflammatory pancreatic lymph node (two), lymphoma (two), ectopic pancreas

(two), serous cystadenoma (two), intraductal papillary mucinous neoplasm (one), duodenal duplication cyst (one), teratoma (one), and thymoma (one). When EUS-FNA was performed, the sensitivity, specificity, positive and negative predictive values, and accuracy with respect to the diagnosis of malignancy were 76.2%, 100%, 100%, 70.6%, and 84.4%, respectively. Furthermore, ten patients underwent therapeutic EUS. EUS-D was performed in eight patients (pancreatic pseudocyst: five, walled-off necrosis: two, and perirectal abscess: one) and EUS-CPN in two patients, with good progress after treatment and no adverse events.

Clinical impact

In 87 (81%) patients, D-EUS or I-EUS altered both the diagnosis and treatment. The clinical impact of EUS was major and minor in 65 (61%) and 22 (20%) patients, respectively. For each organ, the clinical impact was classified as major and minor for pancreatobiliary diseases, gastrointestinal disorders, and mediastinal masses in 50 (62%) and 13 (16%), 13 (54%) and 9 (37%), and 2 (100%) and 0 (0%) of the patients, respectively (TABLE 4).

DISCUSSION

The findings of the present study have shown that D-EUS and I-EUS are both safe because they do not exhibit any serious adverse events and are effective, provided there is a sound indication. The indications in children are similar to those in adults, although these indications are less frequent in children. EUS is valuable in the diagnosis and therapy of gastrointestinal diseases in cases where a conclusive diagnosis is not possible based solely on imaging results[14].

The ESGE/ESPGHAN guidelines recommend the use of EUS in children exclusively in tertiary centers with physicians experienced in I-EUS, which was the case in our study[8]. Mahajan et al. studied 121 children and analyzed 123 EUS, seven EUS-FNA, and two EUS-D procedures. Bleeding, fever and a decline in oxygen saturation have been reported as adverse events[14]. In the present study, which included 107 children, approximately five times more EUS-FNA and I-EUS procedures were performed (33 and ten procedures, respectively). However, there were no adverse events related to the procedure or anesthesia. The most frequent indication, both in the study by Mahajan and in the present study, was pancreaticobiliary disease (76% of the EUS procedures performed in both studies).

The major difference between EUS performed in children and adults is the use of anesthesia. The former requires anesthesia and intubation while undergoing both I-EUS and D-EUS procedures. Patient cooperation, associated comorbidities, and complexity of the procedure are key factors to be considered[20]. In the present case series, no adverse events related to anesthesia were observed.

The use of a conventional echoendoscope was not a limiting factor either in the present study or by Varadarajulu et al.[15]. According to the American Society for Gastrointestinal Endoscopy, the radial and linear endoscopes used in adults should be employed with caution in children weighing ≤15 kg due to the rigidity of the distal tip. This rule is applicable to oblique viewing radial endoscopes but not to forward-viewing radial endoscopes, such as the one used in the present case series. In children weighing ≤15 kg, the use of a miniprobe has been recommended[12,24]. However, it was not used in this series. The use of a conventional forward-viewing radial echoendoscope showed no limitations in children weighing ≤15 kg. Conventional echoendoscopes have a distal diameter of 11–14 mm (radial) or 14 mm (linear), whereas miniprobes have a diameter of 7.4 mm. Miniprobes can be inserted via the working channel of a conventional forward-viewing endoscope, but their efficacy is low because the examination is limited by the wall thickness of the studied organ[24].

Several studies have reported the successful use of EUS in pediatric patients. The indications are the same as those in adults. However, there are fewer neoplastic diseases in children than adults (despite the increasing frequency of pancreatobiliary diseases among children)[5]. EUS-FNA has become an important tool for the histological or therapeutic diagnosis of gastrointestinal diseases[2,19,25].

D-EUS tends to replace endoscopic retrograde cholangiopancreatography as a diagnostic tool for pancreatobiliary diseases, both in adults and children. EUS contributes to the diagnosis of conditions found only in children, such as congenital anomalies, solid pseudopapillary neoplasia, and certain anorectal disorders[13,26]. In the present study, 81 (76%) procedures were performed to evaluate pancreaticobiliary diseases (TABLE 2).

Overall, EUS findings modified the diagnostic or treatment strategy in 87 patients (80.5%). This high performance can be explained by the conclusive diagnoses made in pancreatobiliary diseases, such as chronic pancreatitis[9], microlithiasis[13], and pancreatic masses[27].

As in previous studies, the evaluation of pancreatobiliary diseases was the most common indication for EUS. EUS is a sensitive tool for studying the pancreas and bile ducts and detecting chronic pancreatitis due to the proximity of the pancreaticobiliary region to the stomach and duodenum, which facilitates a detailed evaluation by EUS[10]. This aspect and the ability to obtain tissue samples (EUS-FNA) are advantages over other imaging techniques[13,25].

In the data reported herein, 33 EUS-FNA procedures were performed. One earlier study reported the results of 13 EUS-FNA procedures in a similar patient population[16]. The findings of the present study corroborate the efficacy and safety of EUS-FNA in children because no adverse events were observed during or after the procedure. In a prior study, the indications for EUS-FNA were pancreatic masses, pancreatic pseudocysts, and celiac plexus blockade, with one adverse event recorded after EUS-FNA, namely

TABLE 4. Clinical impact in pediatric patients after D-EUS and I-EUS.

Clinical impact	Biliopancreatic (%)	Gastrointestinal (%)	Mediastinum (%)	Total (%)
Major	50 (62)	13 (54)	2 (100)	65 (61)
Minor	13 (16)	9 (37)	0 (0)	22 (20)
No changes	18 (22)	2 (9)	0 (0)	20 (19)
Total	81	24	2	107 (100)

EUS: endoscopic ultrasonography; D-EUS: diagnostic EUS; I-EUS: interventional EUS.

a case of acute pancreatitis[16]. The histological yield of EUS-FNA was 69% in another study[16] and 81 (76.2%) in the present study. The indications for EUS-FNA (33 procedures) in our study were: pancreatic masses (12 cases), differential diagnosis between SET and ExTC (seven), hypoglycemia (four), recurrent acute pancreatitis (three), jaundice (two), abdominal pain (two), mediastinal masses (two), and enlarged pancreas (one). In addition, surgery was the definitive therapy for 68 (63.3%) of patients in the present series.

In the present study, perirectal abscess (one case), pancreatic pseudocyst (five), and walled-off necrosis (two) were the causes of abdominal fluid collection that indicated I-EUS. Conventional drainage was performed with excellent results. EUS-D was performed with the implantation of double-pigtail plastic stents following fistula dilation[7] and a hot AXIOS self-expandable metal stent implantation in one case of pancreatic pseudocyst (a 12-year-old boy who presented with pancreatic fracture due to abdominal trauma)[27]. In the present case series, pancreatic pseudocyst was the most common occurrence, consistent with the findings of other published series[28]. The causative factors for pancreatic pseudocysts are closed abdominal trauma, recurrent acute pancreatitis, and acute necrotizing pancreatitis[29]. Large pancreatic pseudocysts present a risk of rupture, and those ≥6 cm in size and persisting for >6 weeks are considered favorable for a step-up approach[29]. EUS-D is more effective than percutaneous drainage, but both are associated with lower morbidity and mortality than surgery[28].

EUS-CPN is another pediatric indication for I-EUS. Two children with chronic pancreatitis were reported to undergo this technique with encouraging results[2]. Differential diagnosis between SET and ExTC is another common indication in children. Although the incidence of SET in the pediatric population is unknown, its incidence in the general population is 0.4%[5]. The frequency of this indication in the present case series was 17 (16%), which is considerably higher than that reported in the literature.

The present study has established that EUS in children has a significant therapeutic impact and helps to avoid more invasive procedures. It assists in planning the therapeutic strategy to be adopted by indicating whether surgery, therapeutic endoscopy, or neither is required. The present study has demonstrated the safety of I-EUS, mostly represented by the EUS-FNA technique, which provides vital information for the control of pediatric diseases with accurate results. In the present series, EUS had a considerable clinical impact in 87 (81%) of patients. In other studies, clinical impact ranged from 78% to 93%[1,2,5,12,13,15,30].

The role of EUS in adult populations has already been well established. However, assessment of its clinical impact in pediatric patients remains limited to some case series[12,25]. The present study represents one of the largest case series focusing on the efficacy and safety of D-EUS and I-EUS in pediatric patients, which has been associated with a significant clinical impact. EUS has evolved from a diagnostic to a therapeutic procedure in a paradigm shift toward the endoscopic management of pathological conditions that previously required percutaneous or surgical approaches[31]. EUS is an emerging modality that allows a detailed evaluation of the pancreas, bile ducts, and mediastinum and aids in assessing gastrointestinal diseases. It facilitates definitive and safe diagnoses via EUS-FNA, as well as treatment by other techniques included in I-EUS, which are as safe as EUS-FNA and have a considerable clinical impact in most children. Thus, EUS appears to be a safe and effective procedure in children when performed appropriately by qualified professionals.

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Authors' contribution

Garcia LL: data collection, writing of the text, statistical analysis; Taglieri E: survey execution; Micelli-Neto O: survey execution; Ardengh JC: survey execution, writing of the text.

Orcid

Larissa Latrilha Garcia: 0000-0003-2594-3593.
Eloy Taglieri: 0000-0003-1039-793X.
Otávio Micelli-Neto: 0000-0003-3803-5578.
José Celso Ardengh: 0000-0002-5932-2499.

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RESUMO – Contexto – A ecoendoscopia (EUS) faz parte da prática clínica diária no diagnóstico e tratamento de doenças digestivas em adultos, no entanto, seu uso em crianças é limitado. **Objetivo –** O objetivo do trabalho foi avaliar o impacto clínico da ecoendoscopia diagnóstica (EUS-D) e ecoendoscopia intervencionista (EUS-I) na população pediátrica. **Métodos –** Por um período de 10 anos, analisamos retrospectivamente os prontuários de 107 crianças (≤18 anos) submetidas à ecoendoscopia alta [102 (95.3%)] e ecoendoscopia baixa [5 (4.7%)] que tiveram teste de imagem ou laboratorial inconclusivos. O impacto clínico foi classificado como forte (quando mudou o diagnóstico e a terapêutica), fraco (modificou o diagnóstico, mas não o manejo) e ausente (não houve mudança nem do diagnóstico e nem no manejo). **Resultados –** 107 meninas (72%) e 30 meninos (28%), média de idade 11.7±4 anos (5–18), foram submetidas à ecoendoscopia. 64 (58%) à EUS-D e 43 (42%) à EUS-I [EUS-FNA em 33 (77%) e 10 (33%) a drenagens (pseudocisto (5), walled off necrosis (2), perirectal abscesso (1)) e neurólise do plexo celíaco (2). O sucesso técnico, clínico e a taxa de efeitos adversos para a EUS-I foram de 100%, 90% e 0%, respectivamente. A via biliopancreática foi estudada em 81 (76%), estômago 14 (13%), reto 5 (4.6%), esôfago 3 (2.8%), duodeno 2 (1.8%) e mediastino 2 (1.8%) casos. O impacto clínico total foi de 81%. O impacto clínico foi forte e fraco para a via biliopancreática (81), gastrointestinal (24) e mediastinal (2) em 62% e 16%, 54% e 37% e 100% e 0%, respectivamente. A sensibilidade, especificidade e acurácia da EUS-FNA com microhistologia foi de 76.2%, 100% e 84.8%, respectivamente. **Conclusão –** Os autores concluem que a EUS-D e a EUS-I são efetivas e seguras quando indicadas corretamente para as doenças digestivas em crianças. A EUS-FNA tem elevada acurácia e pode esclarecer a maioria dos casos duvidosos, determinando o diagnóstico preciso das enfermidades digestivas. O impacto clínico foi grande em relação ao diagnóstico e a mudança do tipo de tratamento na maioria das crianças.

Palavras-chave – Ecoendoscopia; pediatria; biopsia com agulha fina; doenças gastrointestinais; drenagem.

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