

ملاحظات:



Effectiveness of Duplex Doppler Sonography of Portal Vein as a Supplementary Tool in Diagnosis of Pediatric Appendicitis

Thesis

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Radiodiagnosis*

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LIST OF ABBREVIATIONS

AA	Acute Appendicitis
CBD	Common Bile Duct
CT	Computed Tomography
IBD	Inflammatory Bowel Diseases
IV	Intravenous
IVC	Inferior Vena Cava
MRI	Magnetic Resonance Imaging
NPV	Negative Predictive Value
PPV	Positive Predictive Value
PV	Portal Vein
TLC	Total leucocytic count
US	Ultrasound

INTRODUCTION

Acute appendicitis (AA) in pediatrics is the most common non-traumatic acute abdominal surgical emergency **(Monsonis et al., 2020)**.

Despite having a well-known and clear pathophysiological cause, the same cannot be said when it comes to the clinical signs, symptoms and diagnosis of AA. As the disease has multiple differential diagnoses which strongly mimic its clinical criteria for diagnosis **(Hajalioghli et al., 2020)**. The acute abdominal pain that radiates to the right iliac fossa with associated vomiting could be misdiagnosed as gastroenteritis, while the pelvic pain and dysuria could be misdiagnosed as urinary tract infection **(Gadiparthi and Waseem, 2021)**.

Although clinicians suggested multiple scales based on clinical criteria for diagnosis of AA, it depends on subjective information from the patients. This represents a big disadvantage in pediatric patients, as the expression of clinical symptoms cannot be done properly **(Hajalioghli et al., 2020)**.

All the fore mentioned issues raise the need for proper tools for diagnosis of AA, that in turn decrease the rate of negative appendectomies as well as the complicated misdiagnosed cases **(Hajalioghli et al., 2020)**.

Abdominal ultrasound (US) is the preferred initial imaging modality to evaluate children with clinically suspected AA because it is cost-effective, has good diagnostic performance, lacks ionizing radiation, and does not require intravenous (IV) contrast agents. However, limitations remain regarding its sensitivity and specificity in diagnosing AA. This could be attributed to multiple factors including the radiologist experience, the patient's body habitus and his ability to tolerate the US examination, and the different anatomical variants of the appendix tip (**Malia et al., 2021**).

Recent focus was made on the sonographic secondary signs that increase the diagnostic performance of US in border line examinations, where the appendix couldn't be visualized or doesn't meet the criteria for diagnosis of AA in the presence of clinical signs (**Tulin-Silver et al., 2015**).

These secondary sonographic signs are changes that result from the acute inflammatory process that occurs in the right iliac fossa (the anatomical site of the appendix base). These signs include the presence of right iliac fossa fluid, lymph nodes, echogenic fat planes, ileus, and abscess formation (**Reddan et al., 2016**).

Also, hyperemia resulting from the inflammatory mediators and toxins released from the site of inflammation causes an increase in blood drainage through the superior mesenteric vein that unites with the splenic vein to form the portal vein. This

hemodynamic process is reflected by an increase in portal vein flow velocity and diameter (**Lazăr and Ion, 2015**).

The previously mentioned sonographic signs are objective signs that aid in diagnosis of AA. It was also found that non-visualization of the inflamed appendix or the secondary signs has a high negative predictive value, with the likelihood of AA being less than 2% (**Nah et al., 2017**).

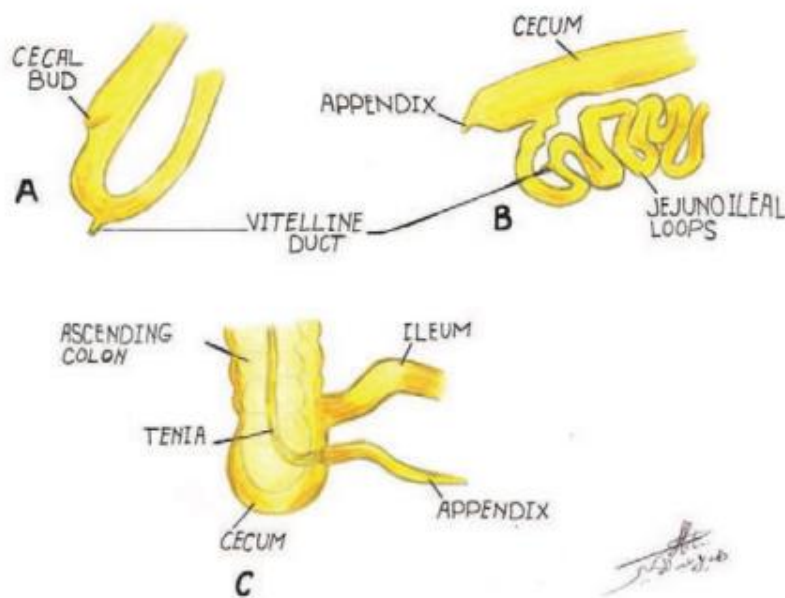
AIM OF WORK

To evaluate the diagnostic accuracy of portal vein flow velocity and diameter in diagnosis of pediatric acute appendicitis.

ANATOMY

EMBRYOLOGY AND GROSS ANATOMY OF THE APPENDIX:

The appendix is histologically visible by 8 weeks. It protrudes as a bud off the caecum at the right upper abdomen, then descends with the cecum to the right iliac fossa as the colon elongates (**Figure 1**) where it adopts various positions of the tip as illustrated in **figure 2** (**Deshmukh et al., 2014**).



**Fig 1. Embryological development of the cecum and appendix. A= 6 week.
B= 8 week. C= at birth (Almayoof and Hamawendi, 2017).**