

Diagnostic Accuracy of Ultrasound to Diagnose Intussusception in Children Taking Surgical Findings as Gold Standard

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ABSTRACT

Aim: To diagnose the accuracy of ultrasound to diagnose intussusception in paediatric patients keeping the surgical finding as gold standard.

Study Design: Cross sectional study.

Setting: New Radiology Department in Services Hospital Lahore.

Duration: 6 months 11/3/2015 to 11/9/2015.

Methodology: Patients of both sex and age below 12 years presenting with colicky abdominal pain, vomiting and current jelly stools were included. The subjects were selected from Radiology department, Services hospital Lahore. The patients fulfilling the inclusion criteria were included in the study after informed consent.

Results: Frequency of intussusception on ultrasound was 186(82.7%) and on surgery was 187(83.1%). The overall sensitivity of ultrasound was 99%, Specificity: 100%, Positive Predictive value: 100%, Negative Predictive value 97% and diagnostic accuracy was 99%.

Conclusion: Ultrasound is good, non invasive modality for diagnosis of intussusception with high diagnostic accuracy.

Keywords: Diagnostic accuracy, intussusception, ultrasound,

INTRODUCTION

When a segment of bowel invaginates into an adjacent segment is called intussusception. Four types of intussusception are described; ileocolic is the most common type, about 80% of cases in children.¹ Clinical presentations include irritability, intermittent crying, abdominal colic, bile-stained vomiting, red jelly stools and palpable abdominal mass. The intermittent abdominal pain, vomiting and right upper quadrant mass has a ppv of 93%.² Intussusception may be idiopathic i.e. 90% and is concerned with meckel's diverticulum, solid bowel mass and lymphoma. It may occur after blunt abdominal trauma.³

METHODOLOGY

Two hundred and twenty five cases were included fulfilling the inclusion criteria.

Inclusion criteria: Patients with suspicion of intussusception presenting with abdominal pain which is colicky and last 15 to 20 minutes, child usually draw their knee up, act very irritable and cry loudly vomiting associated abdominal pain and current jelly stools not responding to antibacterial therapy. Children of either sex from age of 4 months to 12 years were included.

Exclusion criteria: Patients in whom intussusception is already diagnosed either by barium enema or CT scan and patients in whom intussusception is reduced on barium enema were excluded.

Data collection procedure: Brief history regarding duration and symptoms of intussusception was sought. Ultrasound was performed using a probes of 3.5 MHz and 8.0MHz. Serial longitudinal and transverse images was

taken and assessed by a senior radiologist. Positive cases of intussusception was marked as positive intussusception. Then, all the patients were undergoing surgery in supervision of the pediatric surgeon and the cases having positive/negative for intussusception were recorded on proforma. Data was analyzed through SPSS Version 16.

	Surgical findings +ve	Surgical findings -ve
US positive	True +ve (TP)	False +ve (FP)
US negative	False -ve (FN)	True -ve (TN)

Sensitivity= TP/TP+FN x 100 Specificity= TN/TN+FP x 100

PPV = TP/TP+FP x 100 NPV = TN/TN+FN x 100

RESULTS

The detail of results is given in tables 1, 2 and 3

Table 1: Ultrasound Findings Of Intussusception (n=225)

Ultrasound	Frequency	% age
Positive	186	82.7%
Negative	39	17.3%

Fig 1: Barium enema shows intussusception in the descending colon



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Table 2: Surgical Findings Of Intussusception (n=225)

Surgical	Frequency	% age
Positive	187	83.1%
Negative	38	16.9%
TOTAL	225	100%

Table 3: Ultrasound Vs Surgical Findings

		Surgical Findings		
		Positive	Negative	Total
Ultrasound Findings	Positive	186TP	zeroFP	186
	Negative	01FN	38TN	39
Total		187	38	225

Sensitivity=186/186+1*100 = 99% Specificity = 38/38+0*100 = 100%
 Positive predictive value = 186/186+1*100 = 99% Negative predictive value = 38/38+1*100 =97% Diagnostic Accuracy = 186+38/225 *100 = 99%

DISCUSSION

Ultrasound is accurate and cheaper compared to other diagnostic modalities in diagnosis of intussusception. In current study, the overall sensitivity of ultrasonography in detection of IS was 99%, specificity is 100%, PPV is 99%, NPV is 97% and diagnostic accuracy is 99%. One study reported that US is 97.5% sensitive and 99.0% specific for acute IS diagnosis in children in developing country⁴. Ultrasonography is non invasive and rapid procedure. It also confirms persisting symptoms⁵.

Ultrasonography is also used to see transient IS.⁶ Colour doppler has been used to reduce IS by enema.⁷ In a study by Pracros et al⁸. US is helpful in diagnosis of urinary tract disease, ovaries, CBD cyst and volvulus. In one study by Gul P et al, the overall sensitivity of ultrasound was 83.9%, specificity was 95.7% and diagnostic accuracy was 93.7%⁹.

CONCLUSION

It was concluded from this study that ultrasound is good, non invasive modality for diagnosis of intussusception with high diagnostic accuracy.

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