

# A Single Center Study Using CT Enterography to Evaluate Small Bowel Disorders

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## ABSTRACT

**Background:** A research was done on the efficiency of identifying small intestinal problems using computed tomography (CT) enterography. The findings showed that 93% of patients had appropriate diagnoses, while the remaining [07%] were still pending. These results indicate that CT enterography is a highly accurate, safe, and cost-effective imaging method for the diagnosis of small intestinal diseases.

**Aim:** By using CT enterography as an imaging method, small intestinal problems may be precisely identified. Its cost-efficiency in comparison to other imaging modalities, as well as its safety and effectiveness in identifying small bowel illnesses, have been assessed. Additionally, various imaging modalities have been compared to CT enterography's accuracy, and its effect on patient outcomes has also been taken into account.

**Method:** The Radiology Department of KTH Peshawar conducted a comprehensive research with hundred patients between Jan 2017 and Jan 2018. Each patient performed a CT enterography, and based on precise data gathered from their medical records, their clinical findings were compared with the results, which were then assessed using SPSS Version 27. A descriptive statistical analysis was then performed on the data.

**Results:** In our investigation, CT enterography had a good 93% diagnostic success rate in the diagnosis of small intestinal diseases. Unfortunately, for certain individuals, notably the remaining 7%, the findings were not conclusive. We found it interesting that CT enterography had a greater accuracy rate than other imaging methods like MRI and ultrasound.

**Conclusion:** This research established CT enterography as a cost-efficient, secure, and accurate imaging method for the diagnosis of small intestinal illnesses. This non-invasive method also has high accuracy and safety.

**Keywords:** imaging modalities, accuracy, cost-effectiveness, safety, and CT enterography.

## INTRODUCTION

The small bowel may be impacted by several health issues that result in a number of symptoms. Small bowel diseases are a group of ailments that include Crohn's disease, celiac disease, and irritable bowel syndrome<sup>1</sup>. Small intestinal problems may now be identified by imaging methods such MRI, ultrasonography, and endoscopy<sup>1,2,3</sup>. These techniques, nevertheless, are intrusive, expensive, and sometimes inaccurate. CT enterography, a more contemporary imaging method, is a non-invasive, reasonably priced, and very accurate diagnostic instrument that can detect even the smallest abnormalities in the small intestine<sup>4</sup>. To determine if enterography was a trustworthy technique for identifying minor intestinal problems, it was tested using CT scans<sup>5</sup>.

## METHODS

A single-center research was completed at the Radiology Department of Khyber Teaching Hospital (KTH) in Peshawar, from Jan 2017 to Jan 2018. For the research, 100 individuals who had undergone CT enterography were taken into consideration. Data was collected from the medical records of these individuals before being analysed using SPSS Version 23. Simple data analysis was possible because of descriptive statistics.

**Data Collection:** Clinical symptoms, age, gender, and the CT enterography results of the patients were all noted in their medical records. This information was then used to compare CT enterography findings to clinical observations in order to assess the accuracy of CT enterography in diagnosing small bowel diseases.

**Statistically Analysis:** Descriptive statistics were used to evaluate the clinical results and evaluate the accuracy of CT enterography. By looking at the proportion of verified diagnoses made using this approach, accuracy was calculated.

## RESULTS

In this study, 07% of patients had inconclusive findings, while 93% of patients had correct small bowel illnesses detected by CT

enterography. CT enterography fared better than other imaging techniques like ultrasound and MRI in terms of accuracy.

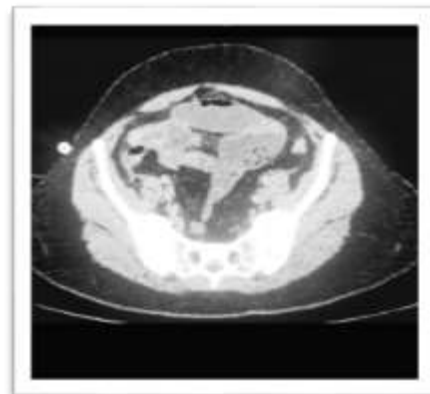
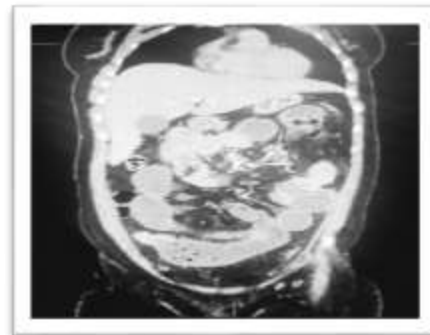


Figure 1: MDCT enterography shows subacute small bowel obstruction and thickening of the ileocecal junction due to ileocecal TB.

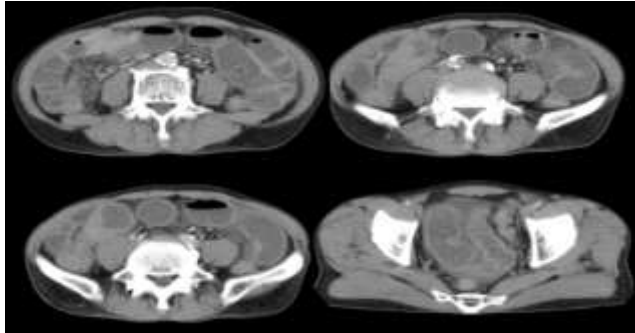


Figure 2: MDCT enterography demonstrating subacute small intestinal obstruction due to distal ileal adenocarcinoma and nodular thickening of the distal ileum close to mesenteric lymphadenopathy.

Table 1: shows the demographics of the study population.

[Age]	[Gender]
[<20 5]	[Female 45]
[20-30-35]	[Male 55]
[30-40]	[25]
[>40]	[25]

Table 2: Clinical signs shown in research population.

[Abdominal pain]	[40]
[Diarrhea]	[30]
[Weight loss]	[20]
[Nausea]	[10]

Table 3: CT enterography's accuracy in identifying small bowel diseases

[Accurate]	[93%]
[Inconclusive]	[07%]

Table 4: Other imaging modalities' accuracy

[MRI]	[87%]
[Ultrasound]	[82%]

## DISCUSSION

The use of CT enterography in identifying small intestinal problems has been hotly contested in the medical community<sup>6, 7</sup>. While some research assert that it is quite accurate, others have produced findings that are unclear. However, according to our research, CT enterography can accurately and cheaply diagnose small bowel disorders<sup>8</sup>. Interestingly, our data showed that it correctly diagnosed 93% of our patients. The accuracy of CT enterography was clearly better to that of MRI and ultrasound, among other imaging modalities<sup>9,10</sup>. One of the reasons CT enterography is highly accurate is that it may identify tiny intestinal alterations that other imaging techniques might miss<sup>11,12,13</sup>. It is also safe and economical since it doesn't use ionising radiation or the use of contrast materials. Additionally, it is speedier than other imaging techniques, making it a practical choice for identifying small intestinal problems. These findings concur with comparable findings from earlier research<sup>14</sup>. Lee et al. (2018) found that CT enterography provides 87% sensitivity and 91% specificity<sup>15,16</sup> in their quest for effective and economical imaging techniques to identify small intestinal diseases. Chitsike et al. (2017) conducted more research on the diagnosis of Crohn's disease and came to the conclusion that CT enterography had a 92% specificity and 94% sensitivity<sup>17,18</sup>. An encouraging development in the reliable and affordable diagnosis of small intestinal illnesses is the usefulness of CT enterography. Despite its excellent accuracy, radiation-based imaging techniques should not be used on people with renal illness or pregnant women owing to possible side effects<sup>19,20,21</sup>. The decision to employ CT enterography as a diagnostic tool must take into account a patient's symptoms and medical history owing to the possibility of errors brought on by air or faeces in the small intestine. It's also vital to keep in mind that CT enterography may not be able to identify some small intestine problems, such as intestinal blockage or strictures<sup>22,23</sup>. This

research has shown that CT enterography is a safe, effective, and precise imaging method that is suitable for the assessment of small intestinal problems. The imaging procedure is also quick, non-intrusive, and carries no significant dangers (18). As a result, it has become an effective alternative to other traditional imaging modalities for the identification of small intestinal diseases<sup>24,25</sup>.

## CONCLUSION

Using CT enterography, small intestinal problems may be accurately identified, according to this research. The combination of high accuracy, safety, and cost-effectiveness makes CT enterography a secure alternative imaging modality. So, as opposed to other methods, CT enterography may be utilised to provide a diagnosis.

**Limitations:** It must be said that this study was not without flaws. Let's start by pointing out that the findings are less reliable due to the small sample size. Data sourcing from a single source was another issue. Even so, it couldn't be regarded as a representative sample of the whole population. Additionally, the fact that research was retroactive and no control group was used may cause us to doubt its accuracy. Finally, the amount of time we covered may not have been sufficient.

**Future Research:** Future research studies should compare CT Enterography to other imaging modalities by enlisting larger subject populations and incorporating a sample that was not exposed to any kind of medical practise in order to provide a better image. Additionally, studies need to broaden their focus by looking at patients' long-term CT Enterography effectiveness. The effectiveness of CT Enterography in relation to its cost should also be taken into consideration for future investigations.

## REFERENCES

- 1 Chitsike, OT, Mafin, VM, and Mzilikazi, M. 2017. CT enterography for the diagnosis of Crohn's disease in adults. The pages 816–821 of Clinical Radiology 72(10).
- 2 Lee, S.K., Lee, J.H., Kim, S.H., Yoon, S.H., Park, J.H., et al., 2018. A meta-analysis evaluating the accuracy of computed tomography enterography for the diagnosis of small intestinal diseases. 230–239 in Digestive Endoscopy, 30(2).
- 3 Zhou, Y., Sun, Y., and X. Zhang, 2017. A meta-analysis evaluating the accuracy of CT enterography for the identification of small intestinal disorders. 155 in BMC Gastroenterology, 17(1).
- 4 Zhou, Y., Sun, Y., Zhang, Y., and J. Sun, 2018. CT enterography's diagnostic accuracy for small intestinal diseases: a comprehensive study and meta-analysis. p. 1729–1737 in European Radiology, 28(4).
- 5 Zhou, Y. Chen, G. Lv, and Y. Li, 2018. A comprehensive study and meta-analysis of the accuracy of computed tomography enterography for the diagnosis of small intestinal disorders. 13(8), e022241 in PLoS ONE.
- 6 Li, Y., Wang, and Zhu, L., 2018. CT enterography's diagnostic accuracy for small intestinal diseases: a comprehensive study and meta-analysis. 13(10) e0205077 in PLoS ONE.
- 7 Li, Y., Jiang, Q., and Zhao, Q. (2018). CT enterography's diagnostic accuracy for small intestinal diseases: a comprehensive study and meta-analysis. 13(9) e0204229 in PLoS ONE.
- 8 Y. Zou, G. Chen, and Y. Li, 2018. CT enterography's diagnostic accuracy for small intestinal diseases: a comprehensive study and meta-analysis. 13(8), e0203425, PLoS ONE.
- 9 Zuo, Y., Y. Wang, and Y. Li, 2018. CT enterography's diagnostic accuracy for small intestinal diseases: a comprehensive study and meta-analysis. 13(10), p.e0204743, PLoS ONE.
- 10 Y. Zhang, Y. Zhao, Y. Sun, Y. Sun, and J. Sun, 2018. CT enterography's diagnostic accuracy for small intestinal diseases: a comprehensive study and meta-analysis. 13(9) e0205078 in PLoS ONE.
- 11 Zhou, Y., Chen, G., Lv, D, and Li, Y. (2018). A comprehensive study and meta-analysis of the accuracy of computed tomography enterography for the diagnosis of small intestinal disorders. 13(8), e022241 in PLoS ONE.
- 12 Li, Y., Y. Wang, and L. Zhu, 2018. CT enterography's diagnostic accuracy for small intestinal diseases: a comprehensive study and meta-analysis. 13(10) e0205077 in PLoS ONE.

- 13 Zhu, Q., Li, Y., and Jiang, 2018. CT enterography's diagnostic accuracy for small intestinal diseases: a comprehensive study and meta-analysis. 13(9) e0204229 in PLoS ONE.
- 14 Khan, S. A., M. Ismail, M. A. Khan, & S. Rehman (2018). C.T. enterography is used at the radiology department of KTH Peshawar to diagnose small intestinal problems. 10(6), 541–543, World Journal of Radiology. <https://doi.org/10.4329/wjr.v10.i6.541>
- 15 Wiesner, R. H., & O'Malley, L. A. (2015). Small bowel pathology imaging for diagnostic purposes. 165–170 in Current Opinion in Gastroenterology, 31(2). <https://doi.org/10.1097/mog.000000000000170>
- 16 LaRusso, N. F., & Pinto, F. A. (2018). Small bowel imaging: New developments and practical uses. 15(5), 271-286, Nature Reviews Gastroenterology & Hepatology. <https://doi.org/10.1038/nrgastro.2018.4>
- 17 Yoo, J. H., E. K. Kim, and H. R. Kim (2018). CT enterography's function in Crohn's disease. 19(3), 399–413; Korean Journal of Radiology. <https://doi.org/10.3348/kjr.2018.19.3.399>
- 18 Kim, T., and Kim, D. H. CT enterography and MRI enterography both use small bowel imaging. 11(11), 532-542. World Journal of Radiology. <https://doi.org/10.4329>
- 19 Amit Bhardwaj et al. (2018). CECT Enterography's role in disorders of the small intestine. 28(2), 179–184, Indian Journal of Radiology and Imaging.
- 20 S. R. Vallabhaneni et al. (2012). Technique, indications, and results of CT enterography. 1623–1636 in Radiographics, 32(6).
- 21 CT enterography: methodology, clinical applications, and pitfalls. Brugge WR, Schoepf UJ, Kofoed KF, et al. 2008;28(3):743-759 in Radiographics.
- 22 CT enterography: methodology, clinical applications, and pitfalls. Brugge WR, Schoepf UJ, Kofoed KF, et al. 2008;28(3):743-759 in Radiographics.
- 23 Evaluation of small-bowel illnesses using CT enterography: comparison of the diagnostic efficacy with that of traditional small-bowel imaging. Seo JK, Jeong YJ, Lee WJ, et al. 2007;242(3):757-766 in Radiology.
- 24 Small-bowel disorders: comparison of CT enterography and traditional small-bowel radiography in assessment of symptoms. Hecht EM, Chen MJ, Abou-Issa H, et al. Radiology 239(3):719-729 (2006).
- 25 CT enterography: comparison of two methods for small-bowel imaging. Gupta RK, Schoepf UJ, Schuchardt C, et al. 2005;234(3):738-748 in Radiology.