



## Original Research Article

# ASSESSMENT OF DUODENUM ON ABDOMINAL CT SCANNING IN SUBJECTS WITH ABDOMINAL PAIN

Pradeep Sadashiv Kulkarni<sup>1</sup>, Ashutosh Dinkar Jape<sup>2</sup>, Digvijay Shahajirao Ghodake<sup>3</sup>

<sup>1</sup>Professor, Department of Radiodiagnosis, Prakash Institute of Medical Sciences (PIMS) & Research, Islampur, Sangli, Maharashtra, India

<sup>2</sup>Associate Professor, Department of Radiodiagnosis, Ashwini Rural Medical College, Hospital & Research Centre, Kumbhari, Solapur, Maharashtra, India

<sup>3</sup>Assistant Professor, Department of Radiodiagnosis, Krishna Institute of Medical Sciences, Karad, Maharashtra, India

Received : 10/02/2026  
Received in revised form : 10/04/2026  
Accepted : 29/04/2026

### Corresponding Author:

**Dr. Digvijay Shahajirao Ghodake**,  
Assistant Professor, Department of  
Radiodiagnosis, Krishna Institute of  
Medical Sciences, Karad, Maharashtra,  
India.  
Email: digvi4630@gmail.com

DOI: 10.70034/ijmedph.2026.2.354

Source of Support: Nil,  
Conflict of Interest: None declared

**Int J Med Pub Health**  
2026; 16 (2); 2118-2121

### ABSTRACT

**Background:** The duodenum is a 25-30cm long small bowel segment, and CT (computed tomography) of the abdomen is routinely performed to assess gastrointestinal pathologies in subjects who present with abdominal pain. In routine daily practice, CT scans are based more on the ilio-cecal junction, colon, and stomach than the duodenum. Also, radiology literature focuses more on the distal small bowel, stomach, and colon. The present study aimed to assess the duodenum on abdominal CT scanning in subjects with abdominal pain.

**Materials and Methods:** All the subjects with abdominal pain and suspected duodenal lesions were referred for abdominal pelvis CT in the Department of Radiology of the Institute during the defined study period. These CTs were assessed for detection of the duodenal lesions, and the data gathered were analyzed statistically.

**Results:** The study assessed 50 subjects who underwent CT at the Institute within the defined study period. The majority of the study subjects were in the age range of 60-69 years followed by 20-40 years of age. The second part of the duodenum was shown to be a commonly involved segment for pathologies followed by the third and fourth parts of the duodenum. Common benign pathology assessed was duodenal diverticulum in 10 subjects and the most common malignant lesion was adenocarcinoma seen in 14 study subjects. Other lesions of the duodenum were rarely seen.

**Conclusion:** The present study concludes that computed tomography scanning is more helpful than other modalities for accurate assessment and adequate evaluation of the duodenum and its pathologies.

**Keywords:** Abdominal pain, CT scan, duodenum, duodenal malignancy, duodenal benign lesions.

## INTRODUCTION

CT (computed tomography) assessment plays a vital role in the assessment of various pathologies of the abdomen that are not diagnosed clinically or on ultrasonography. CT scanning is also very helpful in the assessment of the various pathologies that affect the duodenum accurately and helps in diagnosing the lesion that remains undiagnosed on conventional assessment.<sup>[1]</sup>

Recently, abdominal computed tomography scanning has played a vital role in the identification, assessment, detection, and sometimes as an incidental finding in various cases of duodenal pathologies. Computed tomography scanning can

help in providing the three-dimensional imaging capability of the GIT (gastrointestinal tract) and associated pathologies. Also, CT scanning allows the visualization of the lumen, assessing the abnormalities in the wall and subjacent extramural structures as well as the distant metastasis. Also, lesions in the other organs, bony lesions, and lymphadenopathy can be accurately assessed on computed tomography scanning.<sup>[2,3]</sup>

Duodenum is a 25-30cm long small bowel segment where CT (computed tomography) of the abdomen is performed routinely for assessment of gastrointestinal pathologies in subjects that present with abdominal pain. In routine day-to-day practice, a CT scan is based on the ilio-cecal junction, colon,

and stomach rather than the duodenum.<sup>[4]</sup> Also, literature from Radiology has more focus on the distal small bowel, stomach, and colon. Hence, the present study aimed to assess the duodenum and its pathology, to diagnose various lesions that involve the duodenum, and to provide additional information that involves other organs.

## MATERIALS AND METHODS

The present retrospective observational study was aimed to assess the duodenum and its pathology, to diagnose various lesions that involve the duodenum, and to provide additional information that involves other organs. The study was done at....from.....to....after the clearance was given by the concerned Institutional Ethical committee. The study subjects were from the Department of Radiology of the Institute. Verbal and written informed consent were taken from all the subjects before participation.

The study assessed 50 subjects from both genders and all age ranges who presented to the Institute within the defined study period with complaints of diarrhea, vomiting, abdominal pain, and for few other conditions and were referred for the CT scanning of the abdomen and pelvis with or without contrast to the Department of Radiology of the Institute within the defined study period and were assessed for various pathologies of duodenum. In all the subjects' routine pre-procedural assessment was done following the protocol for the CT scan study. The inclusion criteria for the study were subjects that were referred for a computed tomography CT scan of the abdomen and pelvis. The exclusion criteria were subjects that had absolute contraindications for CT scanning.

These included a plain CT scan of the abdomen and pelvis followed by arterial phases that were obtained following a negative test done for non-ionic contrast by injection of 1-2ml/kg body weight of intravenous contrast media via cubital vein using a pressure injector at a rate of 1.5ml/sec. The scan was then done after 6 seconds of starting the intravenous agent. In the venous phase which was after 45-60 seconds, scan parameters assessed were volumetric data from the vessels in the axial plane and were reconstructed in the sagittal, coronal plane. Slice of thickness 1 mm was attained with Kvp120, MAS=200, Pitch-1.5, and collimation as 0.6mm.

In all the included subjects, conventional abdominal CT scans were done using the radiopaque contrast agent material that distended the gastrointestinal tract. In cases that had a suspicion of duodenal pathology, few techniques were employed to optimize the duodenum imaging.

## RESULTS

The present retrospective observational study was aimed to assess the duodenum and its pathology, to diagnose various lesions that involve the duodenum, and to provide additional information that involves other organs. The study assessed 50 subjects who underwent CT at the Institute within the defined study period. In the present study, the majority of the study subjects presented with chief complaints of upper GI bleeding, vomiting, and abdominal pain and were referred for abdomen pelvis CT scanning. Among all the assessed subjects, 50 subjects were found to have abdominal pathology.

Among 50 study subjects assessed, there were 28 male and 22 female subjects in the present study. The majority of the study subjects were 60-69 years old with 20% (n=10) subjects followed by 16% (n=8) subjects each from 20-29 and 30-39 years, 12% (n=6) from 50-59, 8% (n=4) from 40-49 and >80 years each, and 4% (n=2) subjects from <10 and 10-19 years each respectively [Table 1].

It was seen that common involvement was seen for the second part of the duodenum in most of the pathologies followed by the third part and fourth part of the duodenum. The least common involvement was seen for the first part of the duodenum which was commonly involved in cases with peptic ulcer disease and commonly showed presentation of peptic perforation.

The study results showed that on CT scan, the most common benign pathological lesion seen was duodenal diverticulum seen in 10 subjects and the most common malignant lesion seen was adenocarcinoma in 14 study subjects. Among these subjects, 4 subjects depicted liver metastasis and 12 subjects showed lymph node metastasis. Other pathologies recorded were rare as carcinoid, lymphoma, tuberculosis, trauma, and MISC in 4, 2, 2, 4, and subjects respectively. Four subjects had Superior mesenteric artery syndrome (SMA) syndrome. Two subjects with SMA presented with pain, vomiting, and bowel destruction [Table 2].

**Table 1: Distribution of study subjects based on age**

S. No	Characteristics	Number (n)	Percentage (%)
1.	Age range (years)		
a.	<10	2	4
b.	10-19	2	4
c.	20-29	8	16
d.	30-39	8	16
e.	40-49	4	8
f.	50-59	6	12
g.	60-69	10	20
h.	70-79	6	12
i.	>80	4	8
	Total	50	100

**Table 2: Pathology-related distribution in study subjects**

S. No	Pathology	Number
1	MISC	8
2	Trauma	4
3	TB	2
4	Lymphoma	2
5	Carcinoid	4
6	Groove pancreatitis	4
7	Diverticulum	10
8	Adenocarcinoma	14

## DISCUSSION

The present study assessed 50 subjects who underwent CT at the Institute within the defined study period. In the present study, the majority of the study subjects presented with chief complaints of upper GI bleeding, vomiting, and abdominal pain and were referred for abdomen pelvis CT scanning. Among all the assessed subjects, 50 subjects were found to have abdominal pathology. These data were comparable to the studies of Barat M et al in 2017 and Padussis J et al in 2005 where authors assessed subjects with GI bleeding, vomiting, and abdominal pain for duodenal pathologies as subjects in the present study.<sup>[5,6]</sup>

Of the 50 study subjects assessed, there were 28 male and 22 female subjects in the present study. The majority of the study subjects were 60-69 years old with 20% (n=10) subjects followed by 16% (n=8) subjects each from 20-29 and 30-39 years, 12% (n=6) from 50-59, 8% (n=4) from 40-49 and >80 years each, and 4% (n=2) subjects from <10 and 10-19 years each respectively. These demographics were in line with the previous studies of Morley NP et al in 2009 and Millet I et al in 2015 where authors assessed subjects with demographic data comparable to the present study in their respective studies.<sup>[7,8]</sup>

The study results showed that common involvement was seen for the second part of the duodenum in most of the pathologies followed by the third part and fourth part of the duodenum. The least common involvement was seen for the first part of the duodenum which was commonly involved in cases with peptic ulcer disease and commonly showed presentation of peptic perforation. These findings were consistent with the results of Tonolini M et al in 2017 and Carbo AI et al in 2014 where authors in their studies have also reported the most common involvement of the second part of the duodenum in most of the pathologies followed by third part and the fourth part of the duodenum as seen in the results of the present study.<sup>[9,10]</sup>

It was seen that on the CT scan, the most common benign pathological lesion seen was duodenal diverticulum seen in 10 subjects and the most common malignant lesion seen was adenocarcinoma in 14 study subjects. Among these subjects, 4 subjects depicted liver metastasis and 12 subjects showed lymph node metastasis. Other pathologies recorded were rare as carcinoid, lymphoma, tuberculosis, trauma, and MISC in 4, 2, 2, 4, and subjects respectively. Four subjects had Superior

mesenteric artery syndrome (SMA) syndrome. Two subjects with SMA presented with pain, vomiting, and bowel destruction. These results were in agreement with the findings of Cronin CG et al in 2008 and Okuyama Y et al in 2011 where the most common benign pathological lesion seen was duodenal diverticulum and the most common malignant lesion seen was adenocarcinoma similar to the present study was also reported by the authors in their respective studies.<sup>[11,12]</sup>

## CONCLUSION

Within its limitations, the present study concludes that computed tomography scanning is more helpful compared to other modalities for accurate assessment and adequate evaluation of the duodenum and the pathologies associated with it. However, the study had a smaller sample size and was single-institutional. Hence, further studies are warranted with a larger sample size and multi-institution can help further clarify the issue.

## REFERENCES

- Chen JJ, Lee HC, Yeung CY, Chan WT, Jiang CB, et al. Meta-analysis: the clinical features of the duodenal duplication cyst. *J Pediatr Surg.* 2010;45:1598-606.
- Al Sarraf AA, McLaughlin PD, Maher MM. Current status of imaging of the gastrointestinal tract. In: Adam A, Dixon AK, Gillard JH, Schaefer-Prokop CM, eds. *Grainger & Allison's Diagnostic Radiology: A Textbook of Medical Imaging.* 7th ed. Philadelphia, PA: Elsevier; 2021:chap 18.
- Sun CH, Li X, et al. Multidetector computed tomography (MDCT) manifestations of the normal duodenal papilla. *Eur J Radiol.* 2013;82:918-22.
- McNeeley MF, Lalwani N, et al. Multimodality imaging of diseases of the duodenum. *Abdom Imaging.* 2014;39:1330-49.
- Barat M, Dohan A, et al. Mass-forming lesions of the duodenum a pictorial review. *Diagn Interv Imaging.* 2017;98:663-75.
- Padussis J, Loffredo B, McAneny D. Minimally invasive management of obstructive gastroduodenal tuberculosis. *Am Surg.* 2005;71:698-700.
- Morley NP, Pyrras AT, Yaghmai V, Miller FH, Nikolaidis P. Biliary dilatation and duodenal intussusception secondary to enteric duplication cyst: MDCT diagnosis. *Emerg Radiol.* 2009;16:243-5.
- Millet I, Doyon FC, et al. CT of gastro-duodenal obstruction. *Abdom Imaging.* 2015;40:3265-73.
- Tonolini M, Ierardi AM, et al. Non-perforated peptic ulcer disease: multidetector CT findings, complications, and differential diagnosis. *Insights Imaging.* 2017;8:455-69.
- Carbo AI, Sangster GP, Caraway J, Heldmann MG, Thomas J, Takalkar A. Acquired constricting and restricting lesions of the descending duodenum. *Radiographics.* 2014;34:1196-217.

11. Cronin CG, Lohan DG, et al. Duodenal abnormalities at MR small-bowel follow-through. *AJR Am J Roentgenol.* 2008;191:1082-902.

12. Okuyama Y, Kawakami T, et al. A case of ischemic duodenitis associated with superior mesenteric artery syndrome caused by an abdominal aortic aneurysm. *Case Rep Gastroenterol.* 2011;5:278-82.