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Ultrasound Evaluation of Colorectal Malignancy with Contrast Enhanced Computed Tomography as Gold Standard

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Abstract: ***Background and objectives: Colorectal carcinoma is one of the most common consequential cause of death from cancer in the west and is the 6th most common cause of cancer deaths India. These tumors can enlarge with time and then invade the colon consummately. Early detection and treatment is critical. Computed tomographic (CT) is a non-invasive and rapidly evolving investigation that is a potential alternative to conventional flexible colonoscopy for colorectal malignancy screening. However, the lack of CT equipment in the lesser developed places mandates the use of ultrasound for detection of the disease. Prevention and early detection are key factors in controlling and curing colorectal cancer. Indeed, colorectal cancer is the second most preventable cancer, after lung cancer. When the cancer is found early, initial treatment can often lead to an excellent outcome. Today, the average person has about a 1 in 20 chance of developing colorectal cancer during his or her life. Therefore the need to study the usefulness and accuracy of ultrasound (USG) scan in detecting colorectal lesion at the earliest is necessary and validated. Materials and methods: Thirty one patients with colorectal malignancies were studied. They were included in the study if they met the inclusion and exclusion criteria. The sex ratio, age distribution was noted, tabulated and charted. Results: Of the 31 cases with colorectal malignancy studied, it was observed that males aremore commonly affected by colorectal malignancies than women with a ratio of 2:1.It most commonly affects people in 4th to 6th decade of life. CECT showed most patients presented with irregular heterogeneously enhancingcircumferential wall thickening of the involved bowel (96.8%), sometimes associatedwith mass (19.4%). Most of these patients presented with pain abdomen, bleedingper rectum with or without constipation.Ultrasound abdomen shows high sensitivity (87.1%) in detecting colon wallpathology however; the lesion is the rectum alone, were frequently missed (58%). Besides, involvement of adjacent viscera was identified by USG in 84%. USGevaluation of metastatic secondaries had limited results (limitation for pulmonarymetastasis) and therefore staging of themalignancy with ultrasound was found inaccurate. Conclusion: Ultrasound of abdomen shows high sensitivity in detecting large bowel malignancies except for lesions involving the rectum. If coupled with transrectal ultrasound or rectosigmoidoscopy,can be very effective tool for screening purposes as it displays high sensitivity and specificity. In low volume centres where CT is not available or not affordable by the patient, USG abdomen coupled with trans-rectal ultrasound (TRUS) can be considered as modality of choice for screening purposes. However, once a lesion is detected, CECT plays a major role in staging and further management.***

Keywords: Carcinoma colon, CECT colon, USG colon, colon cancer, colorectal cancer

1. Introduction

In patients suffering with colorectal carcinoma, 5-year survival rate is about 83%–90% if the disease is confined to the bowel wall. In advances cases where there isdistant metastasis, the survival rate is less than 10%. Therefore, early detection andtreatment are very critical [1].

Screening for colorectal diseases so far included a per rectal digital examination, aoccult faecal blood test, and colonoscopy (including sigmoidoscopy). Computedtomographic (CT) is a non-invasive, rapidly evolving imaging technique that is apromising alternative to conventional colonoscopy for screening of colorectaldisease. Colorectal cancer is the second most preventable cancer, after lung cancer[2],[3]. Prevention and early detection are key factors in controlling and curing colorectal cancer. When the cancer is found early, initial treatment can often lead to an excellent outcome. Today, the average person has about 5% chance of developing colorectal cancer during his or her life[4]. And hence, the need to study the efficacy of ultrasound in detecting these lesions is of paramount importance.

2. Methodology

2.1 Source of Data

The study is a prospective comparative studyconducted in 31 cases between January 2015 to October 2016, in the department of Radio diagnosis, Justice K. S. Hegde Hospital, Mangalore.

2.2 Method of Study

All patients with clinical signs or symptoms ofcolorectal lesion later evaluated to have colorectal malignancy are included. Blind USG wasdone on patients after CECT in cases where USG was not already performed.

2.3 Inclusion Criteria

Patients referred to department of Radiodiagnosis with suspected colorectal pathology which eventually proved to be malignant

2.4 Exclusion Criteria

Patients with contraindication for CT. (Pregnancy, Renal failure).

Patient refusal to participate in the study.

2.5 Statistical Analysis

Diagnostic comparison using Sensitivity, Specificity, Positive predictive value (PPV), Negative predictive value (NPV) and accuracy were done.

3. Results

Out of the 31 cases with colorectal malignancy, it wasobserved that the commonest location of occurrence with 8 patients was the sigmoidcolon (25.8%), followed by 7patients each showing lesions in rectosimoid junction and isolated to rectum (22.5%). Transverse colon was the next common locationwith 3 patients (9.7%).

Table 1: Location of lesions as in CECT

Location	*Frequency*	*Percent*
Caecum	1	3.2
Caecum and ascending colon	1	3.2
Descending / Sigmoid colon	2	6.5
Rectum	7	22.6
Rectum / Sigmoid colon	7	22.6
Sigmoid / Descending colon	1	3.2
Sigmoid Colon	8	25.8
Splenic flexure	1	3.2
Transverse Colon	3	9.7
Total	31	100.0

3 of these cases (9.7%) were not picked up in the ultrasound evaluation at all and were reported normal. All of the above 3 patients had pathology involving the rectum!

Table 2: Location of detected lesion on USG

Location	*Frequency*	*Percent*
Caecum	1	3.2
Caecum and ascending colon	1	3.2
Transverse Colon	2	6.5
Descending colon	1	3.2
Rectum	3	9.7
Rectum / Sigmoid colon	4	12.9
Sigmoid colon	12	38.7
Splenic flexure	1	3.2
Transverse Colon	3	9.7
Total	**28**	**90.3**

Out of the 31 cases studied, the adjacent viscera were normal in19 cases and involved in 12 cases (38%). USG showed involvement of adjacent viscera only in 10 cases .

Table 3: Comparison of visceral involvement

Adjacent visceral involvement - CT	Adjacent visceral involvement - USG	Frequency & comparison	Percent
Anterior abdominal wall	Anterior abdominal wall	1	100.0
Involves adjacent small bowel	Involves adjacent small bowel	1	100.0
Involves the prostate	Involves the prostate	1	100.0
Involves the Urinary bladder	Involves the urinary bladder	4	80.0
	Normal	1	20.0
Total - 5		5	100.0
Involves the Uterus	Normal	1	33.3
	Involves the uterus	2	66.6
Total - 3		3	100.0
Involves the vagina	Involves the vagina	1	100.0
Normal	**Normal**	**16**	**84.2**
		3	**15.8**
	Total	**19**	**100.0**

6 of the 31 (19%) cases showed metastatic deposits, 2 in liver and 4 in lungs. The ultrasound detected the liver lesions but the lungs could not be sonologically evaluated for obvious reasons.

4. Discussion

This was a hospital based comparative study to describe the role of ultrasound in the detecting and evaluating colorectal malignancies.

Abdominal pain was the commonest symptom in patients with malignant lesionsof the colon and rectum. Bleeding per rectum was the second most commonsymptom in thesepatients. Few patients also presented withconstipation. Rectum was the commonest site formalignant lesions (45.2%).

In our study it was observed that ultrasoundwas not sensitive for the lesions locatedin the rectum. It could successfully demonstrate only 3 of 7 (42.8%) lesions locatedin the rectum. Out of the 3 lesions identified, length of involvement and extent oflesion could not accurately studied.

For the 24 cases with lesion other than in rectum, ultrasound could effectively detect all of them.

Ultrasound could not differentiate T1/T2 lesions from T3 lesions. Only T4 lesionscould be categorized separately from T1/2/3. Ultrasound was able to categorize 10 of the 12(83%) cases diagnosed by CT as T4 lesions.

5. Conclusion

Ultrasound is highly sensitive in detecting bowel wall pathology with its disadvantage mostly limited to rectum. Coupling of ultrasound abdomen with transrectal ultrasound (TRUS) or rectosigmoidoscopy can be very effective tool for screening for colorectal lesions in low volume centres where CT is not available or is unaffordable for the patient.

Ultrasound abdomen can also be used for large scale screening purposes in focus groups with high incidence of Colon malignancies, coupled with TRUS it becomes a highly sensitive and specific imaging modality.

Once the screening is positive, CECT holds paramount value for further evaluation, staging and planning of management.

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