Results

This study included 20 patients with rectal carcinoma: 14 cases were diagnosed pathologically as adenocarcinoma, 5 cases as mucoid adenocarcinoma and 1 case was signet ring cell carcinoma (Table 1).

Table (1): Pathological diagnosis

Pathological types	No of cases	%
Adenocarcinoma	14	70%
Mucoid adenocarcinoma	5	25%
Signet ring cell carcinoma	1	5%

Table showing the pathological type of cancer rectum according to the post operative histopathology.

As regarding the tumor location 1 case the tumor was in the upper third (12-16 cm from anal verge), in 4 cases, it was in the middle third (8-11 cm from anal verge) and in the remaining, the tumor was seen in the lower third (4-7 cm from anal verge) (Table 2).

Table (2): The anatomical location of the tumors.

Site of the lesion	No of cases	%
Upper third 12-16 cm	1	5%
Middle third 8-11 cm	4	20%
Lower third 4-7 cm	15	75%

Table showing anatomical position of tumors in number of cases of percentages of cases, lower 1/3 tumors presented in 75% of cases.

9 of the 20 patients were treated by abdominoperineal resection, 8 patients by low-anterior abdominal resection and 3 patients by posterior pelvic excentration.

In 19 patients of our study, the whole extent of the lesion was properly examined by TRUS, while in 1 patients only the lower extent of the lesion was examined, this was because of the stenotic nature of the lesion which prevented passage of the instrument.

In all cases examined by barium study, there was one or more of the followings: destruction of the mucosal pattern, ulcerations, filling defects, annular strictures or tumor mass projection into the lumen.

The results of TRUS and CT were compared in the 20 patients with histopathologic staging.

Interpretation of the TRUS scans was facilitated using the five layer anatomic model.

Using TRUS, tumor lesion were considered as T_2 in 1 case, T_3 in 16 cases and T_4 in 3 cases.

In the lesion staged as T_2 by TRUS, the scan showed invasion of the rectal layers up to the muscularis propria with no penetration of muscularis propria or perirectal fat planes. However, CT examination of the same patient showed localized thickening of the rectal wall with suspected perirectal infiltration. Histopathological examination coincided with TRUS, confirming that there was not perirectal infiltration.

In the 16 cases studied by TRUS and staged as T_3, there was invasion of al rectal layers with perirectal infiltration without pelvic organ involvement. CT examination showed the same findings in 18 cases whereas histopathologic examination confirmed the findings in only 14 cases.

Overall, 18 of 20 cases were correctly staged as regards depth of invasion by TRUS with an accuracy of 90%, as compared to 80% accuracy of CT examination (16 to 20 cases).

Table (3): Comparison of TRUS, CT and histopathologic assessment of the tumor depth of invasion (T).

Stage	TRUS	CT	Histopathology
T_1	-	-	-
T_2	1	-	1
T_3	16	18	14
T_4	3	2	5

Table showing number of cases staged by TRUS and CT according to the tumor depth of invasion in comparison histopathological finding, TRUS is scaring high accuracy in early cases while both TRUS and CT are nearly equal in detecting advancing cases.

TRUS was used to determine the degree of tumor invasion and pelvic organs infiltration. Of the 5 patients pathologically proved to have pelvic organs infiltration, TURS diagnosed 3 cases, in 2 of them the infiltrated organ was the prostate and in 1 case, the uterus was the organ

involved. While CT examination diagnosed only 2 cases in whom the prostate and the bladder were infiltrated by the tumor (Table 4).

Table (4): Comparison of TRUS, CT and postoperative pathology in evaluating infiltration of pelvic organs.

	TRUS	CT	Pathologically
Prostate	2	1	2
Uterus	1	-	1
Bladder	-	1	1
Vagina	-	-	1

Infiltration of the vagina was detected pathologically in 1 case, and was not detected by either TRUS or CT.

According to TNM staging and its correlated Astler-Coller modification of Duke's staging classification, TRUS succeeded to predict correct staging in 114 cases with accuracy of 70% while CT could only predict correct staging in 9 cases with accuracy of 40% (Table 5).

Table (5): Comparison between staging accuracy of TRUS and CT in relation to histopatholgoic staging

Staging		TRUS		CT		Histopathology
Astler-Coller	TNM	Diag	Pathologically accurate	Diag	Pathologically accurate	
A	$T_1 N_0 M_0$	-	-	-	-	-
B_1	$T_2 N_0 M_0$	-	-	-	-	-
B_2	$T_3 N_0 M_0$	12	8	6	2	9
B_3	$T_4 N_o M_0$	1	1	0	-	1
C_1	$T_{1-2} N_{1-3} M_0$	1	1	0	-	1
C_2	$T_3 N_{1-3} M_0$	4	3	12	4	5
C_3	$T_4 N_{1-3} M_0$	1	1	1	1	3
D	$T_{any} N_{any} M_1$	1	1	1	1	1
Total		15		8		20
Percent		70%		40%		100%

During the initial phases of this study it soon became apparent that normal nodes and most echogenic "reactive" nodes were not imaged and that the presence of hypoechoic well defined lesions in the pararectal tissues was usually indicative of a lymph node metastasis. The smallest positive node detected had a diameter of 0.5 cm. No hyper echoic nodes were imaged.

One hypoechoic node detected by TRUS did not show any tumor when isolated and examined pathologically.

TRUS predicted lymph node involvement in 7 cases and no involvement in 13 cases (Table 6).

Table (6): Lymph node evaluation by TRUS, CT and histopathlogy

	TRUS	CT	Histopathology
+ve lymph nodes	7	14	10
-ve lymph nodes	13	6	10

TRUS in comparison with histopahtology showed that there were 6 true positive, 8 true negative, 1 false positive and 5 false negatives with overall accuracy of 70%, the sensitivity for predicting involvement was 54.5%, specificity 88.8%, positive predictive value "PPV" 85.7% and negative predictive value "NPV" 61.5%.

Comparing TRUS and CT with histopathology (Table 7), CT results showed 8 true positive, 3 true negatives, 6 false positives and 3 false negative. The accuracy was 55%, sensitivity 72.7%, specificity 33.3%, positive predictive value 57.1% and negative predictive value 50%.

Table (7): The overall comparative results of perirectal lymph node evaluation by both TRUS and CT

	Accuracy	Sensitivity	Specificity	PPV	NPV
TRUS	70	54.5	88.8	85.7	61.5
CT	55	72.7	33.3	57.1	50%

Regarding the size of lymph nodes, in 10 cases proved to have lymph nodes positive for metastasis. Lymph nodes were > 5mm in 8 cases, while, lymph nodes were < 5mm in 2 cases and in 10 cases proved

to have lymph nodes negative for metastasis: lymph nodes were < 5mm in 6 cases, while, they were > 5mm in 4 cases (Table 8).

Table (8): Size dependent distribution of both positive and negative perirectal lymph nodes.

	≤ 5mm	> 5 mm
+ ve lymph nodes	2	8
-ve lymph nodes	6	4

According to size, there was a tendency towards more underestimation by TRUS in tumors larger than 2cm2 in diameter. TRUS showed underestimation in 4 cases "20%", proper estimation in 15 cases "80%" and no overestimation.

Iliac lymph node involvement was diagnosed in 1 cases which was proven later intra-operatively and pathologically. The same case showed focal deposit as was proven by abdomino-pelvic ultrasound scan.