



Alison Douglass
Gillian Lieberman, MD

November

Colon Cancer

Alison Douglass, Harvard Medical School Year III

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Our Patient

Mr. K. is a 67 year old man with no prior medical problems other than hemorrhoids which have caused occasional rectal bleeding over the last 20 years. Over the last 6 months, he has noticed an increase in the frequency and amount of bleeding.



Differential Diagnosis based on Patient History

- Hemorrhoids
- Diverticula
- Vascular anomalies
- Cancers or polyps
- Colitis (infectious, idiopathic, ischemic or radiation induced)
- Uncommon conditions include postpolypectomy bleeding, solitary rectal ulcer syndrome, cecal ulcer (especially in renal failure), NSAID-induced ulcers or colitis, neoplasms other than adenomas or adenocarcinomas, trauma, ectopic varices (most commonly rectal), lymphoid nodular hyperplasia, vasculitis, aortocolic fistulas, and amyloidosis

(Pfenninger)



Mr. K. continued

- He presented to his PCP for his yearly physical
- At this time he admitted to having an older brother with colon cancer
- Upon digital rectal examination, a posterior rectal mass was palpated.
- Colonoscopy detected a rectal mass 6cm from the anal verge and biopsy revealed well-differentiated adenocarcinoma



Clinical Presentation of Colon Cancer

- Hematochezia or melena: 40%
- Abdominal pain: 44%
- Change in bowel habit: 43%
- Weakness: 20%
- Anemia without gastrointestinal symptoms: 11%
- Weight loss: 6%



Primary Diagnosis

- Digital rectal exam (DRE) and colonoscopy with biopsy
- Double contrast barium enema and CT also play a role
- Virtual CT colonoscopy is gaining popularity as a noninvasive screening option



Plain Film With Double Contrast



Double contrast is best at diagnosing large obstructing masses as seen here.

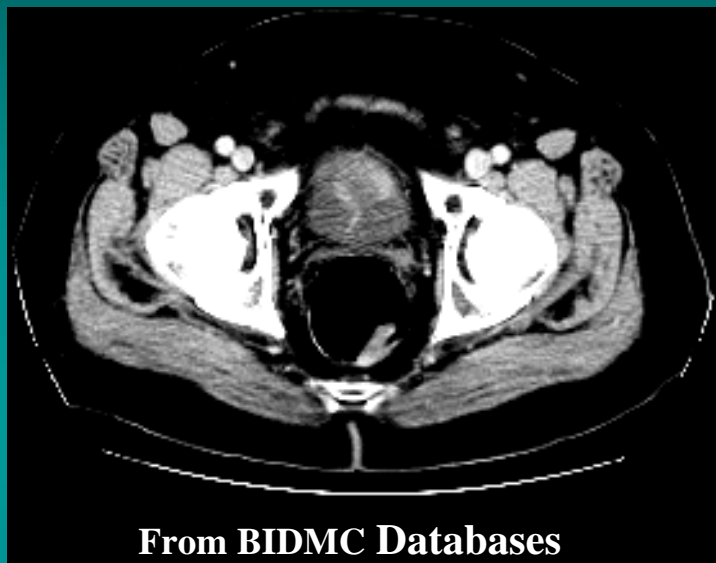
From <http://www.medinfo.ufl.edu/>

- The false-positive rate is less than 1 percent for cancers, 5 to 10 percent for large polyps and 50 percent for small polyps
- Misses about 25 percent of tumors and polyps in the rectosigmoid region

(Rudy and Zdon)



CT



- Seen as intraluminal masses with focal or circumferential wall thickening
- Masses as small as 6mm can be detected
- Differential of CT finding is adenomatous polyps, villous adenoma, adenocarcinoma, malignant lymphoma, melanoma, metastases, carcinoid tumors, and sarcoma (Meyers)



Importance of Radiology in Colon CA

- Staging
- Operative management decisions:
 - Relationship of the tumor to pelvic floor and anal sphincters determine abdominoperineal resection versus a sphincter-saving procedure
 - Assessment of tumor with relation to the prostate/seminal vesicles or uterus/vagina



TNM Staging

- Necessary for evaluating prognosis and treatment options
- T addresses the extent of tumor invasion
- N addresses lymph node involvement
- M addresses distant metastasis



“T” Staging

- Primary Tumor (T)

TX Primary tumor cannot be assessed

T0 No evidence of primary tumor

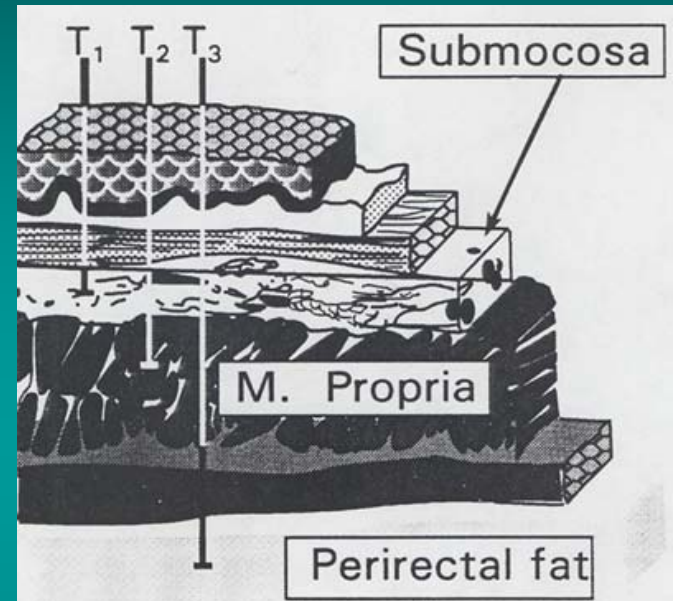
Tis Carcinoma in situ

T1 Tumor invades submucosa

T2 Tumor invades muscularis propria

T3 Tumor invades through the muscularis propria into the subserosa, or into nonperitonealized pericolic or perirectal tissues

T4 Tumor perforates the visceral peritoneum or directly invades other organs or structures

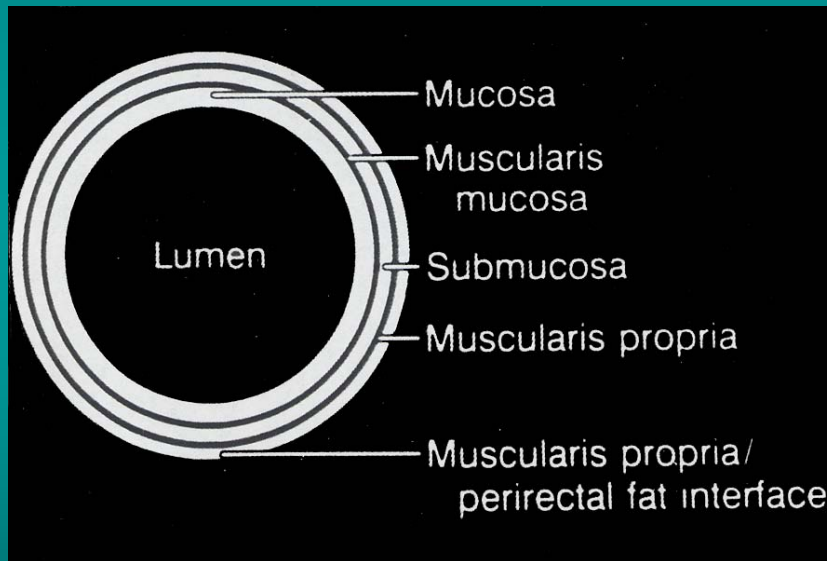


Hussain, S. Imaging of Anorectal Diseases

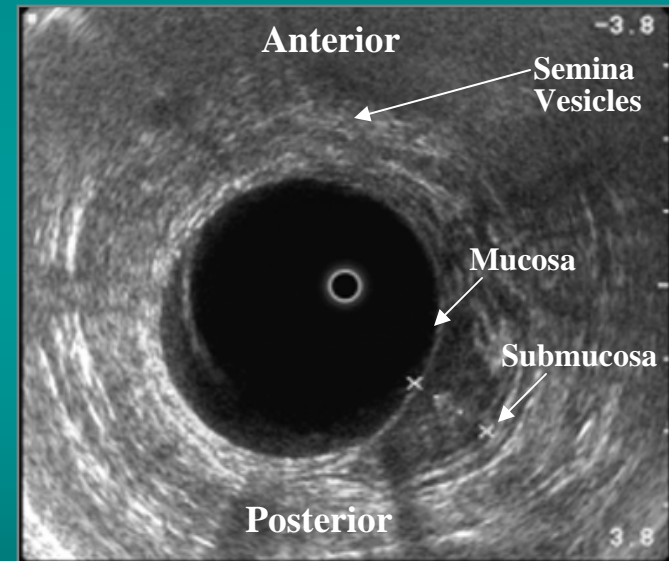


Tumor Staging With US

Assessment of extent of tumor invasion into the bowel wall by US has an accuracy rate between 80 and 90% (Hussein)



Hussain, S. Imaging of Anorectal Diseases



From BIDMC Databases

Mr. K.'s tumor is confined to the mucosa and submucosa with a fat plane between the lesion and the muscularis propria.

Mr. K's lesion is therefore T2



Tumor Staging With CT

- The accuracy of CT for early tumor staging (T1 and T2 tumor) is limited as the submucosa and muscularis are indistinguishable
- Tumors may be diagnosed as T3 when the colon is near mesenteric or extraperitoneal fat allowing extramural spread to be visualized



“N” Staging

- Regional Lymph Nodes (N)

NX Regional lymph nodes cannot be assessed

N0 No regional lymph node metastasis

N1 Metastasis in 1 to 3 pericolic or perirectal lymph nodes

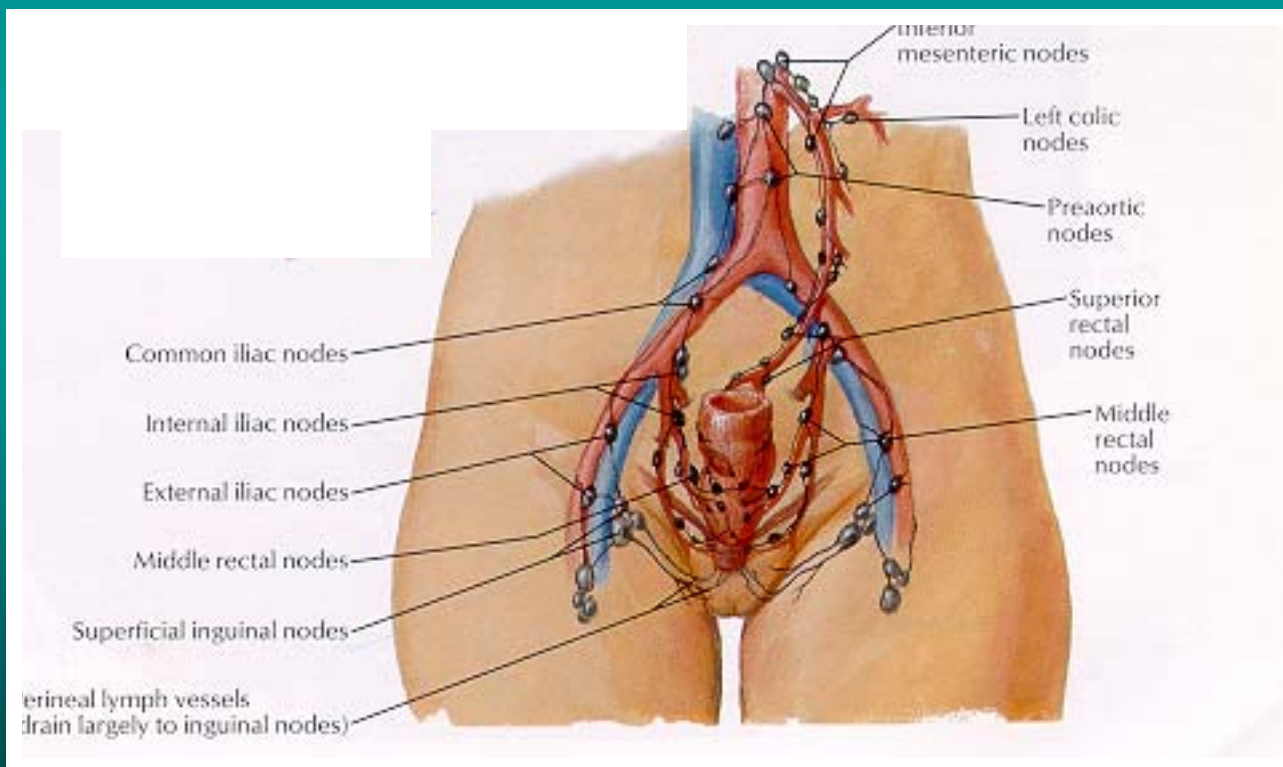
N2 Metastasis in 4 or more pericolic or perirectal lymph nodes

N3 Metastasis in any lymph node along the course of a named vascular trunk



Perirectal/Pericolonic Drainage Areas

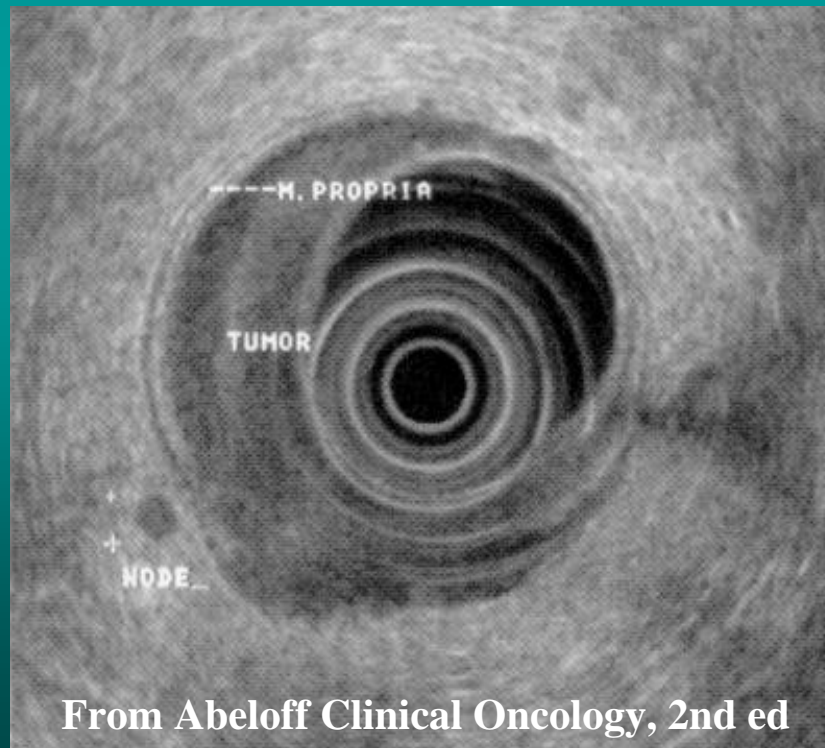
- Inguinal nodes
- Internal and external iliac nodes
- Mesenteric nodes





Lymph Nodes and US

Identification of enlarged lymph nodes has a specificity 28% if 5mm is used as a cutoff, and 62% if 7mm is used as a cutoff (Abeloff)

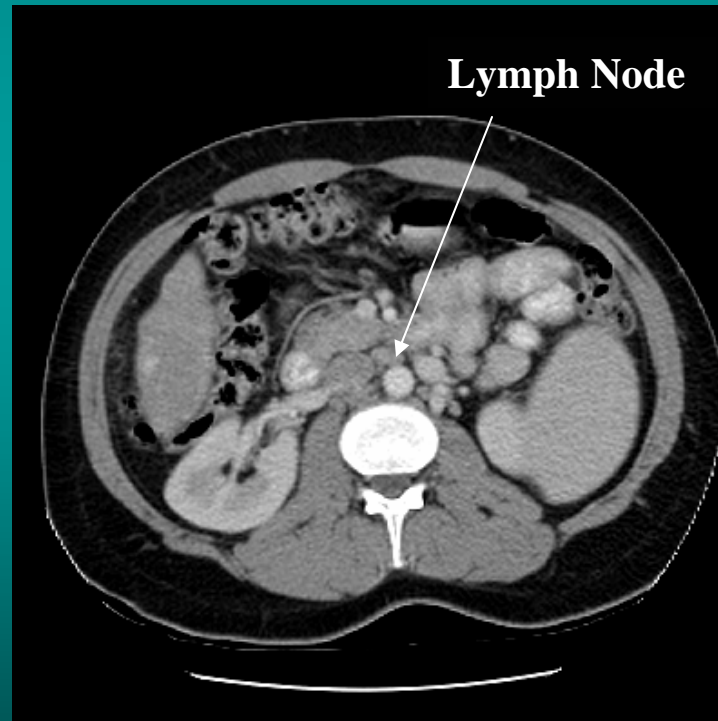


From Abeloff Clinical Oncology, 2nd ed



Lymph Nodes and CT

- Specificity of 56%; Sensitivity of 34% (Meyers)



From BIDMC Databases



Limitations of Radiology and Staging Node Involvement

- There is a poor correlation between nodal enlargement and metastatic involvement.

Lymph nodes also enlarge due to inflammatory response and conversely, metastatic disease can be present in LN with a diameter of less than 5mm.

- High-frequency US transducers provide detailed images of the bowel wall but compromise tissue penetration



“M” Staging

- Distant Metastasis (M)

MX Presence of distant metastasis cannot be assessed

M0 No distant metastasis

M1 Distant metastasis

- Work-up includes:

CT of abdomen (to assess liver and adrenal glands)

CT or plain films of chest (to assess lungs)

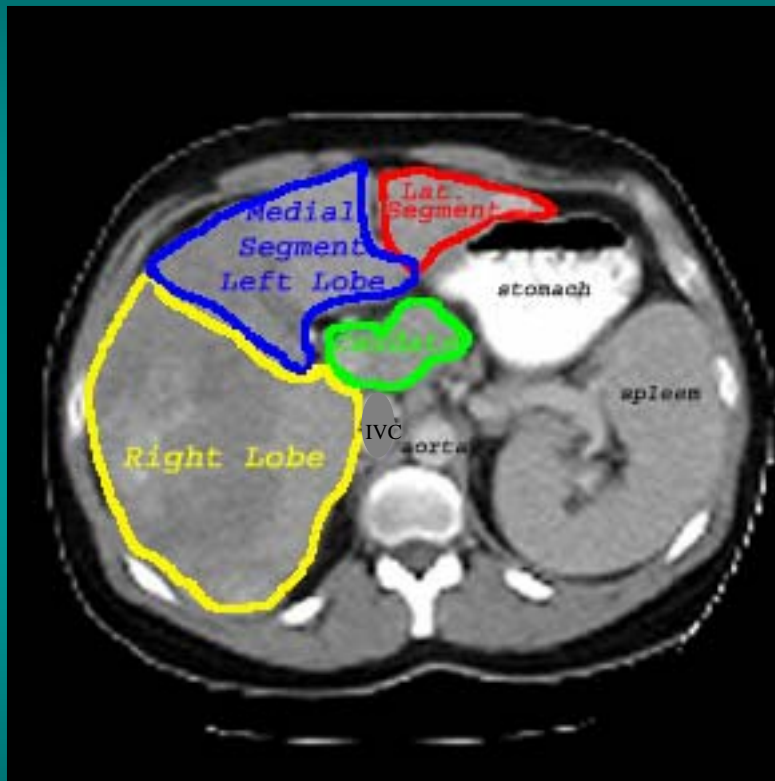


Assessing Metastasis With CT

- CT scans have a sensitivity of 81% to 87% for detecting distant metastases (Abeloff)
- It is most important to detect small, single hepatic lesions as surgical resection of such lesions increases patient survival time



Assessing Metastasis With CT



From BIDMC Databases

Focal parenchymal lesions with decreased attenuation

Mucinous carcinoma (such as this) may have areas of calcification

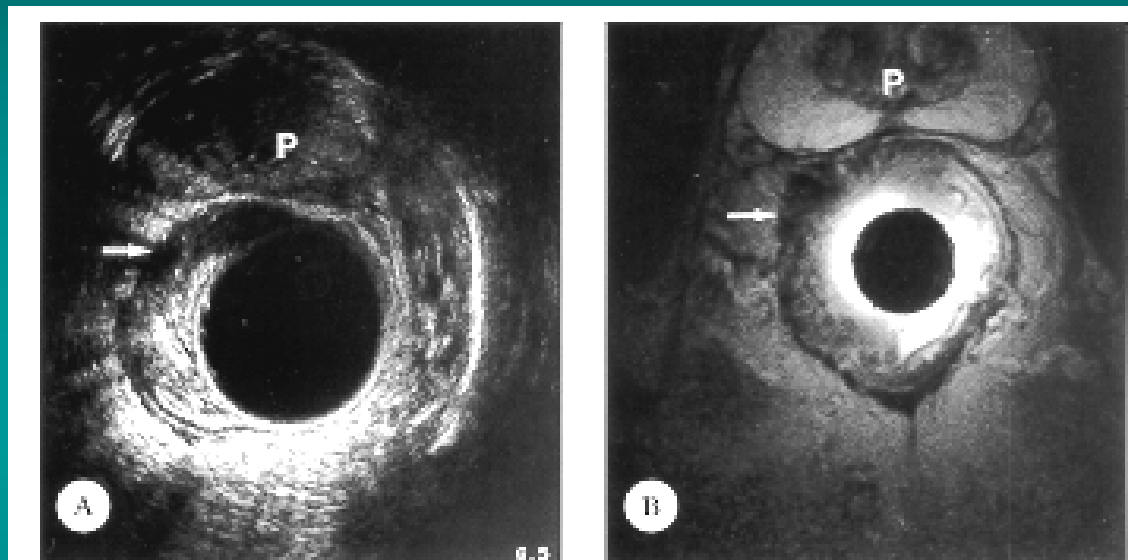


Colorectal Cancer and Standard MRI

- Comparable resolution to CT without radiation.
Accuracy of bowel wall penetration is 64% for MRI vs. 62% for CT
- Sensitivity for lymph node metastasis is 15% to 40% vs. 34% for CT



Endorectal MRI

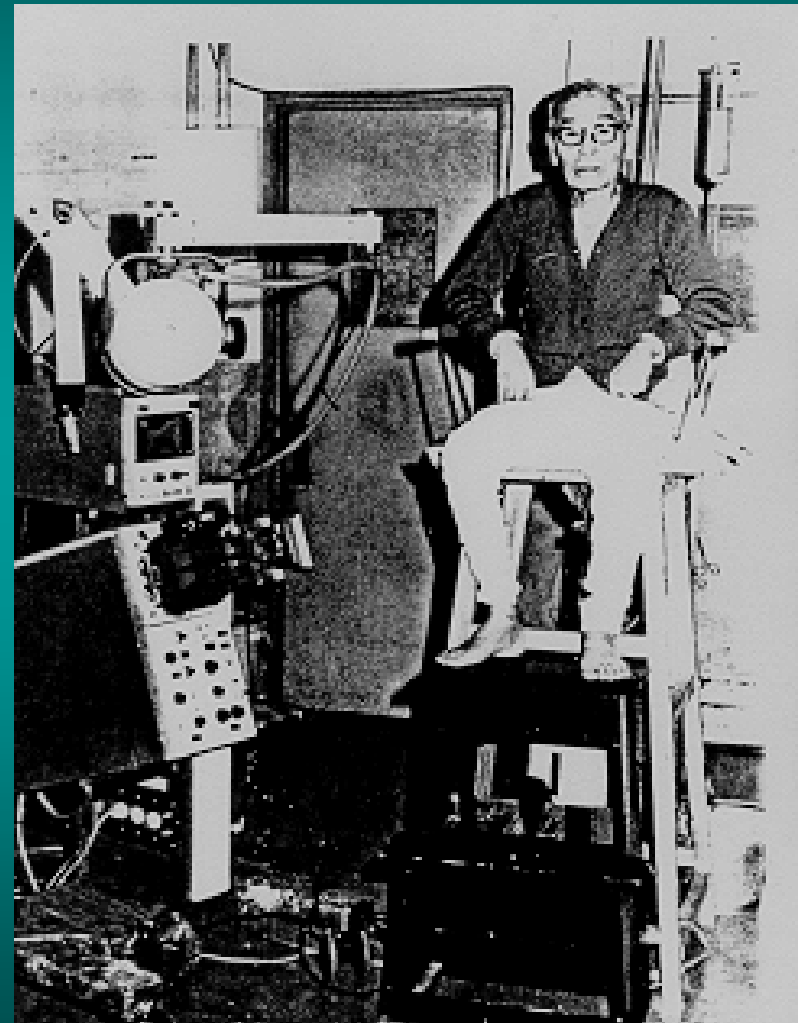
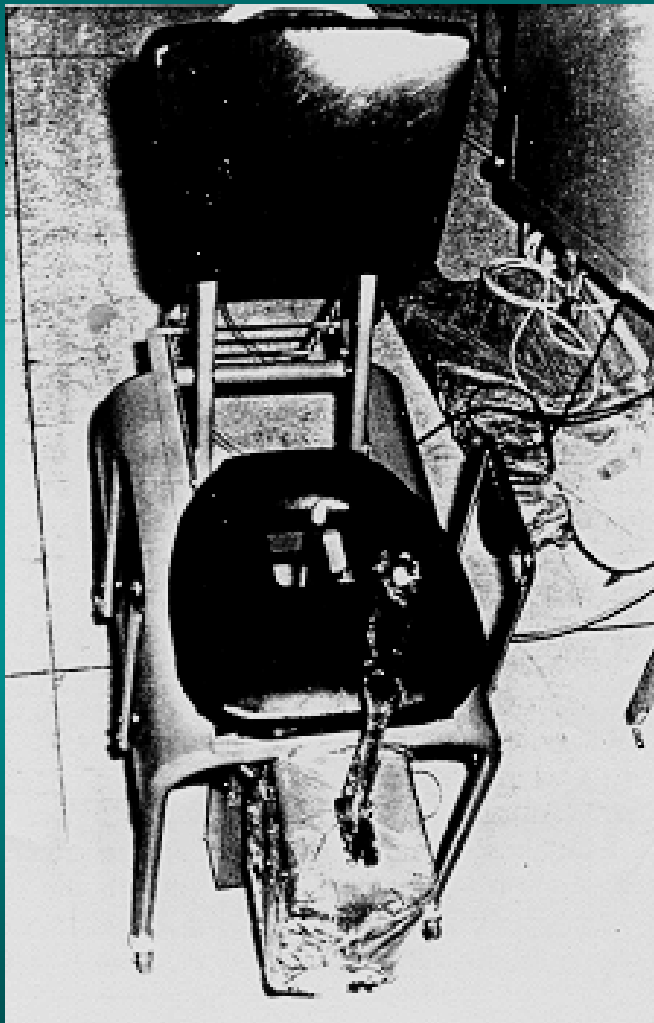


From Hussain, S. Imaging of Anorectal Diseases.

- Accuracy rate for bowel wall invasion has been found to be between 70% and 90% (compared to 80% - 90% for TRUS)
- Specificity for nodal involvement has been found to be 72% (compared to 28% to 62% for TRUS)



We've Come A Long Way Baby...





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Acknowledgements

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