TRANSRECTAL ULTRASOUND OF THE PROSTATE: THE EARLY SINGAPORE EXPERIENCE

H H Tan, W Y Chang, K T Foo

ABSTRACT

During a four-month-period 40 patients presenting to the Department of Urology with mainly retention of urine had their prostates scanned ultrasonically. Eight nodules were detected on the ultrasound of which five were not detected on digital rectal examination. Of the five non-palpable nodules two were diagnosed on ultrasound guided transperineal Tru-cut biopsy to be carcinomas. Of the three nodules detected both on ultrasound and digital rectal examination, two were proven to be carcinomas while the other was benign. The transrectal ultrasound was not only found to be easy to use but was also found to be a useful complement to the urologist's index finger with the added advantage of obtaining good quality biopsy material from suspicious lesions.

Keywords : Transrectal ultrasound, Prostate carcinoma, Digital rectal examination

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INTRODUCTION

The prostate gland has traditionally been assessed by digital rectal examination (DRE) and the diagnosis of malignancy depended very much on the experience of the clinician in detecting nodules or changes in the consistency of the gland. However DRE can only examine the posterior aspect of the gland and it should be no surprise that lesions located in the lateral or inner aspects of the gland may be missed. On the other hand, not all palpable nodules are malignant and Jewett in an analysis of 211 palpable nodules found that 108 (50%) were benign while 103 were malignant[1]. One of the problems in obtaining a reliable pre-operative diagnosis was the lack of a good method of imaging the prostate and this was partly due to its deep location within the pelvis.

In the late sixties, Watanabe and associates in Japan developed transrectal ultrasonography of the prostate[2].Transrectal ultrasound of the prostate (TRUS) was then assessed in the early 70's by King and associates who found it to be a useful adjunct in the diagnosis of prostatic diseases except in chronic prostatitis[3]. Subsequently, another American team found that TRUS was useful in the early detection of cancer. It was also found to be an objective, reproducible and non-invasive method of staging prostatic cancer[4].

While TRUS is now established in the West, we in Singapore had very little previous exposure to it. Hence we took the opportunity to try out the TRUS scanners when two Bruel & Kjaer scanners were made available to us on a trial basis. The aim was to determine if it was feasible for urologists with no formal training in ultrasonography to use the equipment as well as to interpret the images ourselves and also to assess the usefulness of the TRUS.

MATERIALS AND METHODS

Between July to October 1987, 40 patients who presented to the Department of Urology underwent transrectal ultrasound scanning of their prostates. The patients were aged between 50 and 86 years at the time of presentation. Thirty-one presented in acute retention of urine; 6 had symptoms suggestive of bladder outlet obstruction; 2 complained mainly of bone pain and one patient, the youngest, presented with retention and pyrexia. It was thought that he had prostatitis based on the DRE.

Scanning was performed using the technique described by McLeary[5]. The equipment used were the Bruel & Kjaer scanners models 1842 adn 1846 fitted with the endosonic probe 1850 with a 7 MHz transducer for axial scanning and the 8538 probe for saggital scanning. A pre-scanning DRE was done specifically looking for nodules or indurations as well as to exclude poorly prepared rectums or painful ano-rectal conditions. The lubricated axial scanner was inserted with the patient in the left lateral position and the entire prostate gland was imaged starting from the region of the seminal vesicles and bladder base down towards the apex of the gland. The examination was repeated whenever a suspicious area was detected and sagittal views obtained using the saggittal scanner 8538. The scan was regarded as abnormal according to the following criteria:

1. localised area of different echogenicity especially the hypoechoeic ones,
2. asymmetry of the lobes,
3. distortion of the shape of the gland (except the expected change from the triangular to ovoid shape in benign prostatic hyperplasia.
4. capsular breach.

Suspicious areas were biopsied using the technique described by Holm & Gammelgaard[6]. A gauge 14 Tru-cut needle was used to obtain a core of tissue. Aspiration cytology was not done. The procedure was done aseptically and antibiotics were not given as a routine.

RESULTS

Table I summarises the DRE, TRUS and final histological diagnosis (available in 39 as one patient underwent aspiration of pus only). Of the 39 with histological diagnosis, 6 patients had both Tru-cut biopsies as well as transurethral resection of prostate gland done. Two patients underwent Tru-cut biopsies only while 31 patients underwent transurethral resection only. One patient had an unsuspected para-rectal abscess drained transperineally.

Abnormal DRE with abnormal TRUS

In 3 cases DRE as well as TRUS detected nodules in the prostate. Two were proven on Tru-cut biopsy to be malignant while the third case was benign on both Tru-cut biopsy as well as following TURP. Fig 1 is the scan of one of the malignant cases demonstrating distortion of the shape of the gland.

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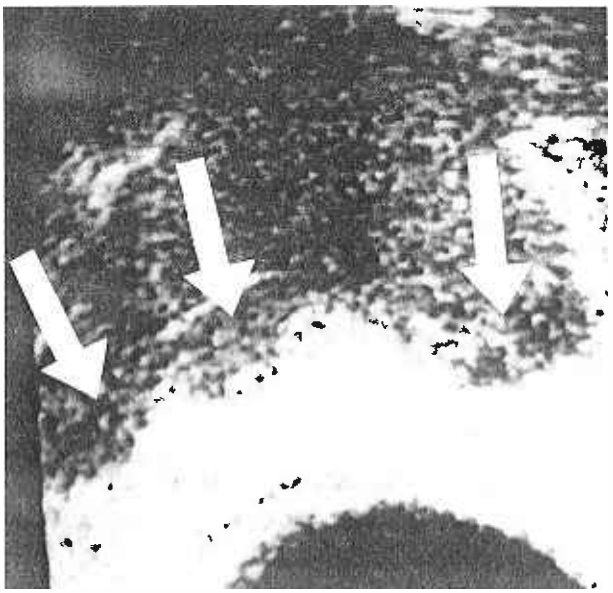
Table I - Summary of DRE, TRUS and Histology

DRE diagnosis	no:	TRUS diagnosis	no:	Histology	no:
BPH	34	BPH	31	BPH	34
Carcinoma	5	Carcinoma	8	Carcinoma	4
Prostatitis	1	Prostatitis	0	Prostatitis	1
Pararectal abscess	0	Pararectal abscess	1	Pararectal abscess	1*
Total	40		40		40

* diagnosed on aspiration

Fig 1 - Palpable hard nodules demonstrated on ultrasound (arrowed)



Abnormal DRE with Normal TRUS

In 2 cases the DRE was deemed suspicious which could not be demonstrated on TRUS. The final histology (following TURP) revealed benign disease.

Normal DRE with Normal TRUS

This formed the largest group with 29 patients. None underwent Tru-cut biopsy as they were on the waiting list for TURP which confirmed the benign nature of their prostatic disease.

Normal DRE with Abnormal TRUS

Five patients who were thought to have benign prostates on DRE were found to have suspicious lesions on TRUS. They all underwent Tru-cut biopsies as well as TURP. Carcinoma was diagnosed in 2 cases on Tru-cut biopsy and subsequently seen again in the TURP chips (See Fig 2). Of the other 3 patients, 2 were proven on both Tru-cut as well as TURP biopsy to be benign. The last case was found to have granulomatous prostatitis on Tru-cut biopsy which was again confirmed following TURP (See Fig 3 and 4).

Prostatitis diagnosed on DRE with final diagonsis of Pararectal abscess

This was a relatively young patient of 50 years presenting with pyrexia, retention of urine and a tender prostate on DRE. He did not totally settle with antibiotics and it was thought that more information could perhaps be obtained with the TRUS. TRUS unexpectedly revealed a para-rectal abscess which was aspirated transperineally initially (See Fig 5). The pus was sent for culture and the abscess was eventually drained transrectally. The patient recovered completely and was able to pass urine well.

Fig.2- The nodule of mixed echogenicity (arrowed) was not palpable

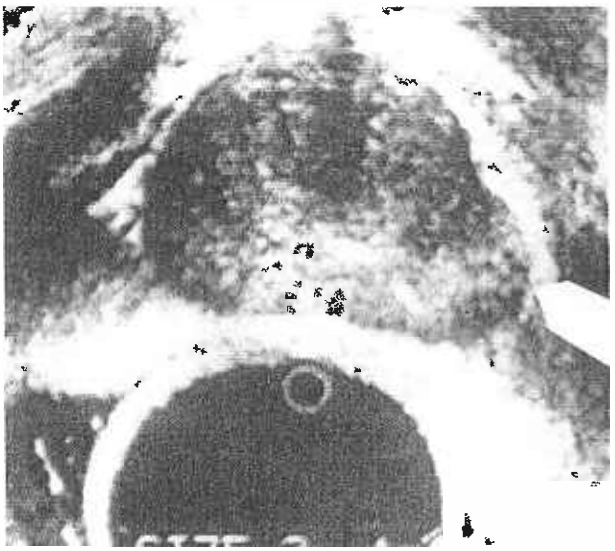


Fig.3 - Axial scan demonstrating multiple hypoechoeic lesions which were not palpable

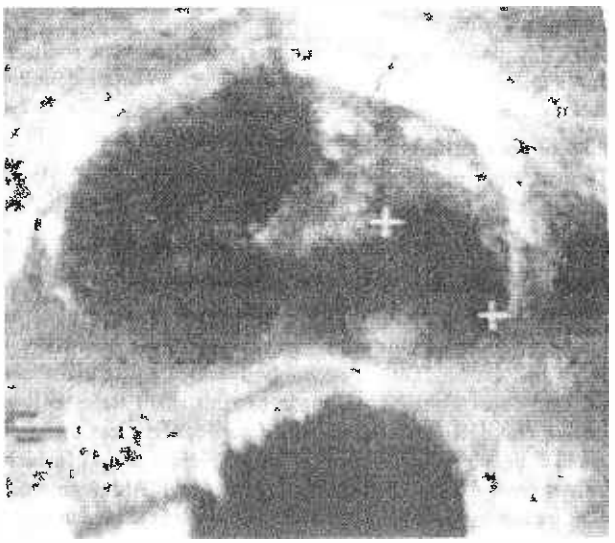


Fig. 4 Same patient as in Fig 3 but scanned saggitally, confirming the hypoechoeic lesions

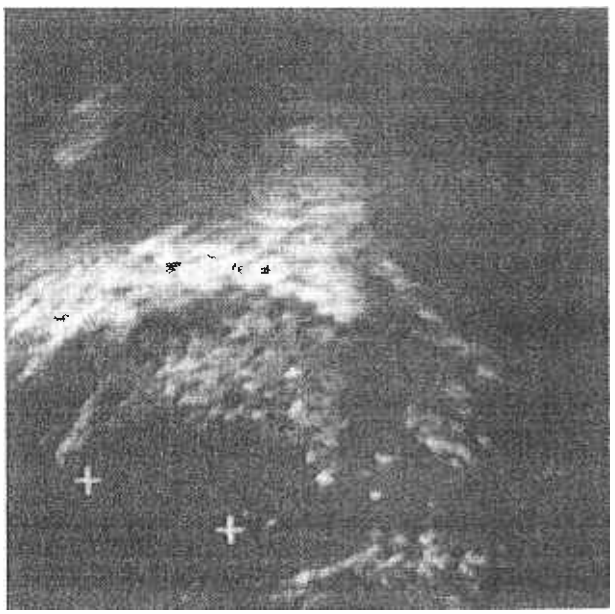
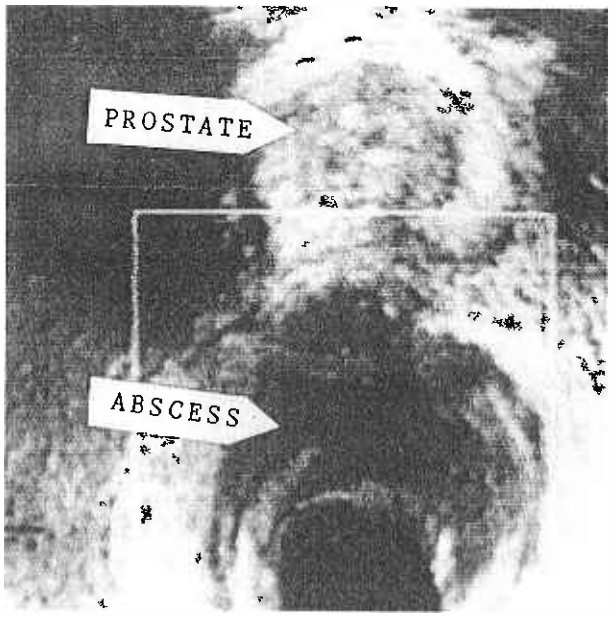


Fig. 5 - Unexpected finding of pararectal abscess which was aspirated transperineally initially



Complications

Only one patient had mild hematuria which lasted about 3 hours following Tru-cut biopsy. There were no septic complications.

Patient acceptability

The scanning procedure was generally well tolerated. However most patients complained of some degree of pain/ discomfort during biopsy.

DISCUSSION

Of the 34 non-suspicious DRE in this study, 2 were found to have carcinoma. On the other hand none of those with normal scans had cancer. This is probably due to the fact that there were no cases with stage A cancers in this small series as it is known that TRUS cannot reliably detect cancers less than 0.5 cm in diameter[7,8]. Eight patients had suspicious scans of which only 4 proved to be cancers (50% sensitivty). Although most cancers are hypoechoeic[9] there are no specific characteristics to distinguish benign from malignant lesions sonographically and obtaining a biopsy from a suspicious area is the obvious solution[10]. Ultrasound guided transperineal biopsy has been shown to be superior to digitally directed biopsy[11] although Resnick demonstrated that ultrasound guidance was not necessary in those with distinct nodules on palpation[12]. We performed 8 ultrasound guided transperineal biopsies successfully. The main problem we noticed was that the 14 gauge Tru-cut needle had a tendency to displace the prostate as the needle penetrated the capsule. This could result in the lesion being missed by the needle especially if the lesion is small. The use of an 18 gauge needle as suggested by Lee and associates or the Biopty gun should eliminate this problem[13,14].

While most investigators will not dispute that TRUS is superior to DRE in detecting prostatic cancer[7,8,15-17] there is less agreement on its role as a screening tool due to is high false positive and negative rates of 12% and 31% respectively[18] and its low positive predictive value of 7%[19]. Other investigators have found TRUS sensitive enough (85%) for screening[20]. Ragde and associates detected 23 nonpalpable cancers on screening 765 patients. Encouraging results were also produced by Nesbitt and associates[21] who found 8 nonpalpable cancers in 240 asymptomatic males. The role of TRUS should be further assessed in view of these contrasting findings.

TRUS has a definite role to play in the follow-up of patients undergoing hormonal or radiotheraphy for cancer[17,22]. In the pre-operative local staging of potential radical prostatectomy candidates, TRUS has been shown to be superior to both CT scanning and magnetic resonance imaging[23-27].

CONCLUSIONS

We discovered that TRUS and the technique of ultrasound guided transperineal biopsy were not difficult to learn just as Vallencien and associates[28] had concluded. There of course is much room for improvement as evidenced by our tendency to overdiagnose cancer on scanning. As interpretation of ultrasound images is operator dependent, it is anticipated that with regular use of the TRUS by interested urologists the chances of making more accurate diagnosis and indeed of detecting early cancers should improve.

From our patients' point of view, the examination was generally well tolerated and safe and it was better for patients to know pre-operatively whether their palpable nodules were malignant from needle biopsy rather than to wait for per operative frozen section diagnosis or paraffin section diagnosis days after the operation.

In the meanwhile, and in the Singapore context, it is perhaps best to regard the TRUS as a useful adjunct to the urologists examining index finger.

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