

TRANSRECTAL ULTRASOUND – IMPACT ON PROSTATIC DISEASES

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INTRODUCTION

Transrectal ultrasound (TRUS) imaging of the prostate has established itself as an important tool in the study of prostatic disorders in recent years since its introduction in the late sixties⁽¹⁾. The basic teaching of digital rectal examination of the prostate is the primary method used by most doctors but the findings of a nodule and assessment of the size of the prostate by the digital method can be of great discrepancies with individual clinicians. The result of a digital examination is therefore most of the time an uncertain diagnosis. Transrectal ultrasound of the prostate contributes to this difficult area of clinical examination by complementing the findings with better imaging of the interior pathology that the finger cannot reach and then guided biopsies can be done to confirm the diagnosis. The volume of the prostate can also be measured accurately in a more scientific fashion rather than the estimation of the size by digital palpation. The use of TRUS nowadays is mainly focused on prostatic carcinoma, prostatic hyperplasia, prostatic abscess⁽²⁾, infertility with low volume azoospermia⁽³⁾ and associated pathology of the urinary bladder and seminal vesicles.

TECHNIQUE OF TRUS

Transrectal ultrasound of the prostate is done as an outpatient procedure or for inpatients without anaesthesia. No special preparation is required except that the patient should have an empty rectum. After an initial digital rectal examination to exclude painful anal conditions and the status of the rectum, the ultrasound probe can be inserted in the usual left lateral or lithotomy position. The prostate can be seen with a three-dimensional image depending on the ultrasound machine used. When biopsy is required, there is usually no complications. A fine trucut needle 18Fr with a fast Biopsy gun is the most favoured and accurate method. Fine needle aspiration cytology is more difficult and requires an experienced pathologist to examine the aspirated cells. There is a low incidence of haematuria and fever of about 3%⁽⁴⁾ after trucut biopsy which can be resolved with antibiotics. Most urologists would give a prophylactic dose of gentamicin before biopsy. The anatomy of the prostate has been carefully studied by McNeal⁽⁵⁾ who proposed a zonal concept of the prostatic gland into different histologic components. The foetal lobulation of anterior, posterior,

middle and lateral lobes do not exist according to the new concept. In the new anatomic system, the prostate is composed of three glandular zones: transitional, central and peripheral zones and one nonglandular region, the anterior fibromuscular stroma. The urethra and ejaculatory ducts pass through these zones. These features can be clearly shown by TRUS and should form the basis of the present clinical assessment of the gland. Benign hypertrophy affects the central zone while prostate carcinomas mostly arise from the peripheral zone⁽⁶⁾.

TRUS IN DETECTING EARLY PROSTATE CANCER

In the USA and United Kingdom, carcinoma of the prostate is now the second and third commonest cause of cancer deaths respectively. In Singapore we are confronted with a rising number of prostatic cancers although the Chinese are known to be ten times less prone to the disease. Before the use of TRUS, carcinomas of the prostate were diagnosed mainly after prostatectomy or digitally which can only detect locally advanced tumours. In almost all the situations there were very little that we could offer for the advanced disease except hormonal treatment and radiotherapy which are mainly palliative in the relief of symptoms. The main advantage of TRUS over digital examination is the detection of early tumours which may not be palpable and therefore renders radical surgery possible to cure the cancer. Ultrasound guided biopsies are more accurate and have a sensitivity of 95% in the detection of carcinoma. Nearly 60-70% of the tumours are hypoechoic but some can be isoechoic or hyperechoic⁽⁷⁾. In combination with the detection of a raised serum prostatic specific antigen, repeated TRUS guided biopsies have definitely increased the yield in early detection of prostatic cancer. In a study on population screening to detect prostatic cancers in the USA, it has been shown to be capable of cost-saving on the treatment for advanced cancer. Whether this is applicable to Singapore will depend on a carefully designed project but it seems unlikely that substantial health cost-saving can be achieved because of the very much lower incidence of prostatic cancer in our country.

TRUS IN STAGING OF PROSTATE CANCER

Stage A prostatic carcinoma, with microscopic foci within the peripheral zone, is difficult to diagnose with digital examination and also by TRUS. Prostatic specific antigen, when elevated without manipulation of the prostate, will certainly arouse suspicion of early prostatic cancer. We are now performing routine random biopsies of the prostate in patients with symptoms of prostatism and elevated prostatic specific antigen. This has certainly increased the detection of Stage A disease which can be treated with radical surgery.

Detection of a nodule at the prostate by digital rectal examination has been for a long time a dilemma to the

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clinicians and many a times the general practitioners do not really understand the significance of a nodule since not all nodules are malignant. TRUS is effective in detecting nodules which may or may not be palpable and biopsy can be done using ultrasound guide with precision. Malignant nodules will be picked up in 90% of the cases. With TRUS we are now detecting patients with stage B prostatic carcinoma and the incidence of radical prostatectomy has increased over the last few years in Singapore.

For stage C disease, TRUS is useful in staging of prostatic carcinoma in its extracapsular extension and seminal vesicle invasion. It is obvious that when invasion occurs, the chance of a cure with radical surgery is not possible. The accuracy of detecting the invasion can be as high as 90%. The volume of the tumour can also be measured and there is a good correlation that larger tumours are more aggressive and therefore have a poorer prognosis.

TRUS IN PROSTATITIS⁽²⁾

Prostatitis is not commonly encountered by most clinicians as a tender oedematous prostate on palpation. Prostatitis, when not due to surgical manipulation, develops exclusively in the acinar prostate at the peripheral zone. When prostatitis is secondary to instrumentation, the central zone is usually affected. Hypoechoic areas can be seen and when abscesses are present, multiple small hypoechoic areas can be detected by TRUS. When abscesses are present together with prostatic obstruction, a transurethral resection may be avoided and antibiotics given for the abscesses to subside or antibiotic cover to be used for cover during resection. In sub-acute or chronic prostatitis, the findings in TRUS can be quite normal but dystrophic calcifications may represent chronic prostatitis. Calcifications within the prostate can be rather difficult to interpret as they may be the result of chronic prostatitis or corpora amylacea which is a proteinaceous material present within the gland. In the presence of prostatodynia, which is a very difficult clinical problem to treat because of the chronic perineal pain involved with variable degrees of symptoms of obstruction, it is often found that the capsule of the prostate is very much thickened on TRUS. The entrapment of an oedematous prostate by the thick capsule therefore gives rise to the chronic perineal pain.

TRUS IN MALE INFERTILITY⁽³⁾

In the detection of pathology related to a low volume near azoospermia type of infertility, a high resolution TRUS machine has to be utilised. This is to detect abnormalities

in the seminal vesicles and ejaculatory ducts within the prostatic stroma. The findings can be ejaculatory duct obstruction, voluminous seminal vesicle dilatation with obstruction and seminal vesicle aplasia which is associated with nonpalpable or absent vas. In cases of seminal vesicle and ejaculatory obstruction, transurethral resection or incision of the verumontanum can be done to relieve the obstruction so that there will be a normal flow of semen during ejaculation. The use of TRUS is to determine the anatomical detail for clinical diagnosis and the use of it early in the investigation should be encouraged. This non-invasive diagnostic tool will certainly be utilised more so that the chance of surgical exploration of the testes and epididymis may be reduced.

COMMENTS

In this issue is a small study by Cheung et al⁽⁸⁾ on transperineal aspiration cytology of the prostate which is not often done because of the difficulty involved in the pathological interpretation. It showed that the chance of cancer was higher if TRUS was positive.

CONCLUSION

TRUS, one of the recent advances in the field of prostatic diseases – carcinoma, prostatitis, prostatic hypertrophy and low volume azoospermia, is a very useful investigation. It can be done without complications and no anaesthesia or preparation is required. We should evaluate the role of TRUS in the early diagnosis of prostatic cancers in Singapore. TRUS has proved itself to be useful in the improved diagnosis and documentation of prostatic diseases and has helped a lot clinically by putting in information on the prostate that we did not have in the past.

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