The value Of Tc99m-Pertechnitate Testicular Scintigraphy In Diagnosis Of Acute Testicular Torsion In Pediatric And Adult Patients

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ABSTRACT

Objective: of this study to evaluate the accuracy of Tc99m-Pertechnitate Testicular Scintigraphy (T.S) in evaluating patients with acute scrotal swelling and suspected testicular torsion in pediatric and adult patients ,by statistical analysis of the results and considering the effect of patients age factor in this regard.

Methods: Seventy five patients (age range 5 to 38 years) with possible acute testicular torsion from July 2000 to July 2003 were enrolled in this study. T.S was performed for all patients. All of the patients with clinically suspected acute testicular torsion underwent surgery. The surgical findings were reviewed and definite diagnoses were established. None of the other patients had surgery and were followed clinically for at least 3 month after and radionuclide imaging.

Results: Seventy Five patients were included in the study , divided into (17 with testicular torsion 58 with non torsion ) according to T.S results. with one false positive and no false negative. Overall, T.S has sensitivity of 100% and a specificity of 97% in identifying a testicular torsion. 7 out of 17 patients with testicular torsion had a salvageable testicle at the time of surgery.

Conclusion: Tc99m scintigraphy is a reliable method for diagnosis of testicular torsion sensitivity and specificity are 100 % and 98 % . There was no significant statistical difference in the sensitivity between pediatric( < 15 years ) and adult age groups( > 15 years).

Key words: Tc99m-Pertechnitate, Scintigraphy , Testicular torsion

INTRODUCTION

Although usually not life-threatening, scrotal pain, swelling, or a mass presenting to the emergency department (ED) should be considered a potential surgical emergency until the etiology is determined. Although most etiologies of acute scrotal swelling are nonemergent, some presentations may result in the rapid loss of a testis if not diagnosed and managed in a timely manner. The most common etiologies of scrotal swelling in the pediatric patient are epididymitis, testicular torsion, and torsion of appendix testis(1). Differentiating these disease processes can sometimes be problematic. The clinical presentation of torsion of the testes, torsion of the testicular appendages, testicular tumor and inflammatory disease may overlap and diagnosis can be difficult(2). Treatment options (emergency surgery, antibiotics, observation) differ dramatically depending on the disease process. The purposes of this study were to determine the reliability Tc99m Pertechnitate Testicular Scintigraphy (T.S) in diagnosing testicular torsion.

PATIENTS AND METHODS

This study was performed at King Hussein Medical Center, from July 2000 to July 2003.We studied 75 patients with a mean age of 13 years (range 5-38). They presented with acute scrotal swelling. T.S was performed to all patients using G.E Millenium Dual head Gamma camera . Dynamic study was performed immediately after injection of Tc99m pertechnitate with doses according to body weight ( from 5-
15 mci) . 2 seconds per frame was taken for one minute , followed by 3 minutes per frame for the next 30 minutes. Reading and agreement on testicular scans results where performed by two Nuclear Medicine physicians.

RESULTS
Table 1 shows the number of patients who underwent T.S .17 patients out of the 75 patients(23%) who underwent T.S had where reported as testicular torsion by demonstrating reduced flow and photopenic defect within the affected side of scrotum (Fig 1), there were no false-negatives and one false-positive. Overall, T.S sensitivity of 100% and a specificity of 98% in identifying a testicular torsion.11 out of 16 patients with testicular torsion was presented after 12 hours, and scans demonstrated rim with increased tracer uptake around the photopenic defect of testes which is characteristic sign of missed testicular torsion. 7 out of 16 patients with testicular torsion identified by T.S presented within 12 hours of the onset of their symptoms and had a viable testicle at the time of surgery. 12 cases (75%) of testicular torsion was in patients below the age of 15 years and the remainder 4 (25%) in patients above the age of 15 years.

There was no significant difference between the sensitivity of this test in pediatric and adult age groups .The only false positive case was found in 25 year old man and was due to hydrocele.

Discussion
It is generally agreed that any male suspected of having a testicular torsion requires immediate surgical exploration. However, differentiating testicular torsion from epididymitis or torsion of appendix testis can be problematic. Furthermore, if all patients presenting with an acute swollen scrotum underwent emergent surgical exploration, a significant number of unnecessary surgical procedures would be performed with attendant costs and morbidity. Numerous textbooks and articles have cited that testicular torsion is the most common diagnosis in the prepubertal male with acute scrotal swelling (3,4). Lewis et al(1) performed a retrospective review of 238 cases of acute scrotal pain encountered in a children's hospital ED. They found incidences of testicular torsion, of 16%. Kass et al(5) studied 77 consecutive children from 1 day to 17 years of age evaluated for scrotal pain and swelling; 21 (27%) patients had a testicular torsion. In our study, testicular torsion was in (21% of patients) representing slightly lower than reported which can be explained by the adult age range which is covered in our study and have lower incidence of testicular torsion. T.S can play an important part in excluding testicular torsion in questionable cases. The clinical presentation of torsion of the testes, torsion of the testicular appendages, testicular tumor and inflammatory disease may overlap and diagnosis can be difficult. 99mTc pertechnetate is injected into a peripheral vein as a bolus with the patient in the supine position.(6) Testicular perfusion can be assessed immediately both by evaluation of flow to the testicles on dynamic images and by assessment of the static images. The non-perfused testicle of acute torsion (Fig 1) can be differentiated from the hyperemic tissue seen in epididymo-orchitis (Fig 2) and other inflammatory conditions. In our study T.S sensitivity and specificity are 100% and 98% respectively. Some studies found Scintigraphy has a sensitivity of 96% and a specificity of 98% with an overall accuracy of 96% as compared with clinical evaluation, which has 66% sensitivity, 96% specificity and 88% accuracy(7). Neither power Doppler ultrasound nor color Doppler has proved to be more useful than scintigraphy in diagnosing torsion. Because of its greater specificity (98% versus 77%), scintigraphy may help prevent unnecessary surgery when color Doppler ultrasound shows equivocal flow.(8) In our study there was no statistical difference in the sensitivity of T.S for pediatric (< 15 years) and older patients (> 15 years) compared to Doppler U.S in which normal prepubertal testes are a source of false-negative flow results Ingram and Hollman(9) noted that 38% of normal boys aged 10 weeks to 13 years had no flow
detectable with color Doppler US. Therefore, the exclusive use of color Doppler sonography in the evaluation of testicular torsion is not recommended in prepubertal patients where radionuclide scintigraphy remains the imaging modality of choice\(^{(10,11)}\). Delayed or missed torsion (more than 24 hour's history) may demonstrate a hyperemic rim on scintigraphy identical to that seen in a scrotal abscess, therefore interpretation in conjunction with the clinical findings is essential. The only false positive result for testicular torsion in our study was found to be induced by scrotal hydrocele. Other scrotal masses like in tumors, haematoma and abscesses may give rise to photopenic defects. Knowledge of patient history, physical examination and ultrasound findings may help to differentiate these conditions from torsion\(^{(12)}\).

**CONCLUSION**

Tc99m scintigraphy is a reliable highly sensitive and specific method for diagnosis of testicular torsion in pediatric and adult patients with no significant influence of patient age over the sensitivity of the test.

Scrotal masses (Hydrocele, hematoma, abscess ...etc) are the major causes of false positive results in T.S, therefore knowledge of patient history, physical examination and ultrasound findings may help to differentiate these conditions from torsion.

**REFERENCES**