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TESTICULAR TORSION: PREOPERATIVE MEAN PLATELET VOLUME (MPV) AND LEUCOCYTE COUNT

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ABSTRACT

Testicular torsion can occur at any age but commonly occurs soon after birth or between the ages of 12–18 years with a peak in incidence at age 13–14 years.The early recognition of testicular torsion has been associated with an increase in the rates of testicular salvage and the prevention of complications such as testicular infarction and infertility. This paper discusses predisposing factors, patient presentation, detection strategies including predictive scoring, differential diagnosis, diagnostic modalities, management options and medicolegal aspects pertaining to patients presenting with suspected testicular torsion in relation to mean platelet volume and leucocyte count.

Keywords: testicular torsion, mean platelet volume, leucocyte count

Introduction

Testicular torsion results from twisting of the vessels supplying the testes with resultant ischemia [1-2]. the clockwise or counterclockwise rotation of the testis along the longitudinal axis of the spermatic cord, is a common pediatric urologic emergency that can lead to testicular circulation disorders, testicular ischemic damage, and testicular loss [3]. It is described as acute or intermittent based on the timing of presentation [4]. It is generally accepted that torsional necrosis of the testis occurs within several hours of TT [5]. When a patient presents with symptoms for less than 24 hours, it is referred to as acute torsion [6]. On the other hand, intermittent torsion is characterized by recurrent scrotal pain caused by intermittent torsion and detorsion of the testis [7]. No definitive test is available for intermittent torsion [8]. Early accurate diagnosis and intervention are extremely important. The typical clinical manifestations of TT are scrotal redness, swelling, and pain on the affected side. However, some children may present with atypical symptoms, such as abdominal pain, nausea, vomiting, groin pain, refusal to feed, irritability, fever, and other non-scrotal symptoms, which may lead to misdiagnosis with gastrointestinal disorders, urinary tract diseases, and appendicitis, [9] and delay treatment. The diagnosis of missed testicular torsion is made preoperatively on ultra sound or confirmed retrospectively during scrotal exploration [8]. Management of testicular torsion involves detorsion of the testes and orchidopexy [8]. Salvage rates are governed by speed of diagnosis and treatment. Delay in diagnosis or treatment can result in non-viable testes, this is described as a missed torsion [10].

Predisposing Factors

In general, the underlying etiology of testicular torsion is not easily identifiable. However, there are a number of factors including genetic factors, environmental factors, preceding trauma and the clapper-bell deformity that may predispose a patient to testicular torsion[11] Although evidence relating to familial inheritance is limited, a meta-analysis suggested that there is a familial link, especially with the occurrence of bilateral testicular torsion [12].

A study conducted by Cunningham reviewed 6 brothers within a family, each of whom developed spermatic cord torsion within a period of 3 years. Each of the brothers were found to have testicular hypermobility predisposing them to testicular torsion.Shleynshyluger et al. [12] While the literature on familial inheritance is limited, there is a likely link between structural deviation and familial predisposition. Another study assessed 70 patients with testicular torsion and found that eight had family members that were previously diagnosed with testicular torsion [13].With regards to environmental factors, there is a recognizable association between a hyperactive cremasteric reflex, cold weather and testicular torsion [14].

Clinical Decision Scoring system

Utilizing clinical scores when assessing patients with an acute scrotum can provide guidance in identifying patients who may require scrotal ultrasonography, urological consultation or urgent scrotal exploration [15]. Various clinical decision tools have been described to assist the

clinician in the diagnosis and work-up of testicular torsion.

The Testicular Workup for Ischemia and Suspected Torsion (TWIST) score focuses on five criteria from the history and clinical examination to estimate the likelihood of testicular torsion. This scoring system was initially validated by Barbosa et al and was utilized in their study. Criteria for this scoring system include testicular swelling (2 points), presence of a hard testicle (2 points), absent cremasteric reflex (1 point), nausea/vomiting (1 point) and a high-riding testicle (1 point). A score of 0–2 is deemed low risk and is associated with a 100% negative predictive value for torsion. In general, ultrasonography and urological consultation are not required in patients in this category. A score of 3–4 is deemed intermediate risk and warrants ultrasonography and possible urological consultation, whereas a score of 5 or more is classed as high risk and is associated with a 100% positive predictive value for testicular torsion [16]. Patients in this category do not require ultrasonography but rather urgent urological consultation and surgery with a view for testicular salvage [17].

A study was conducted to evaluate the validity of the TWIST scoring system when used by non-urologists' medical professionals on a patient sample of 128 patients. Although slightly different cut off values for low, intermediate, and high risk were used (0, 1–5, more than 6, respectively), the authors reported that there were no cases of testicular torsion in the group of patients that were classified as low risk (indicating a 100% negative predicative value). The positive predictive value of patients within the Tanner stages of 3–5 with a TWIST score of ≥6 was 100%; however, an accurate diagnosis was difficult in patients in Tanner stages 1–2. It therefore suggests that this scoring tool can potentially be used in the emergency room setting by non-urologists but advises that if patients are in Tanner stages 1–2, an ultrasound is also recommended including in those with a high-risk TWIST score [18].Other scoring tools, although not widely used, have also shown promise [19].

Differential Diagnosis

The differential diagnosis of testicular torsion is broad. Various scrotal-related pathologies may clinically mimic testicular torsion and present with an acute scrotum. These include scrotal cellulitis, gangrene, edema, scrotal abscess, and fat necrosis secondary to trauma. Pathology of surrounding structures such as rupture of the tunica albuginea, spasm of the cremasteric muscle, torsion of the spermatocele, hydrocele and pyocele may also present with an acute scrotum [20].

Testicular pathologies that may mimic testicular torsion include torsion of testicular appendages, epididymo-orchitis, mumps orchitis, testicular infarct, polyorchidopathia, trauma, ischemic necrosis, tumour-related hemorrhage and myofibroblastic pseudotumor. An infarcted spermatic chord, hematoma and thrombophlebitis associated with varicocele represent conditions affecting the spermatic cord which may mimic testicular torsion. Various systemic conditions can also present with symptoms in keeping with the presentation of testicular torsion. These include polyarteritis nodosa, hypersensitivity angiitis, thromboangitis obliterans, Henoch-Schonlein purpura and familial Mediterranean fever.

Abdominal and retroperitoneal pathologies such as incarcerated strangulated hernia, pancreatic tumour, hemoperitoneum, acute appendicitis, and rarely adrenal hemorrhage in neonates can also mimic testicular torsion [20].

Torsion of the testicular appendages and epididymo-orchitis is the most common mimics of testicular torsion [21]. Torsion of any of the four testicular appendages may present with an acute scrotum, especially in children [22]. The appendix testis is usually located at the superior testicular pole in the groove between the testicle and epididymis. Ninety-five percent of cases of torsion of the appendages are attributed to the appendix testis. Although torsion of the testicular appendages is a benign process, it poses a major clinical challenge due to its similarities with the presentation of testicular torsion. In contrast, epididymo-orchitis is defined as inflammation of the epididymis and testes with or without associated infection. Compared to testicular torsion, symptoms may be more insidious with pain persisting for days to months. Most cases occur between the ages of 18 to 35 years. Concurrent symptoms such as dysuria, hematuria, urinary urgency, fever, and tachycardia are frequently encountered. The presence of a normal cremasteric reflex and a thickened spermatic chord with increased doppler wave pulsation on ultrasonography are both useful in distinguishing epididymo-orchitis from testicular torsion.

Preoperative Mean Platelet Volume (MPV) and Leucocyte Count

The mean platelet volume indicates the level of platelet activity and forms part of a full blood count investigation. It can assess for the presence of inflammation as part of a preoperative assessment. A retrospective study based in Turkey compared the MPV value and leucocyte count of 51 healthy patients to 50 patients with surgically confirmed testicular torsion. The study showed that the mean MPV and the mean leucocyte count were remarkably higher in patients with testicular torsion compared to the healthy patient group. The MPV has been shown to be increased in vascular pathologies of the urological system, although literature is limited. Although the MPV has a low sensitivity in the diagnosis of testicular torsion, it may be useful to support the presence of testicular torsion [23].

Conclusion

Testicular torsion is a time-sensitive diagnosis that requires prompt surgical intervention to avoid testicular ischemia, infertility, and unwanted litigation. When imaging is required, the recommended and most available modality to detect torsion is ultrasonography. In pediatric patients, the use of SMI is supported. This holds high significance in countries where waiting for other imaging modalities may produce unfavorable outcomes. Rates of testicular salvage are better when surgery is performed within 7–12 hours of symptom onset.

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