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Review

Importance of Testicular Torsion Management: A Systematic Review

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Abstract

Testicular torsion is the most important and common urological emergency. The annual incidence of testicular torsion approximately 3,8 per 100,000 boys under 18 years. Prompt recognation, treatment and chase are necessary for testicular salvage. This condition must be excluded in all patients, present with acute scrotum. The patients who suffer from acute scrotum typically have scrotal pain, nausea and vomiting. Some symptoms like pain of lower part of abdomen, painless swallowed scrotum can not occured rare. If anamnesis and physical examination promote torsion, immediate surgical exploration is important. Delay treatment decrease the salvage level of torsion and may necessiate orchiectomy.

Keywords: Surgical time, testicular salvage, testicular torsion

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Having sufficient information about testicular development and scrotal anatomy is important to manage acute scrotal pathologies. When a patient approach with scrotal symptoms time of treatment is crucial for salvage of organ function. The testes develop from concentration of tissue inside of the urogenital ride at nearly six week of gestation. After longitudinal growth of embryo, endocrine and paracrine signals occur, that have not yet described clearly. The testes descent into the scrotum by the third trimester of pregnancy at last. When the testes breaks up the abdomen, peritoneal layer coveres them. This layer called as proccessus vaginalis. Spermatic vessels enter the inguinal canal from proximal and vas deferens creats spremetic cord. At the end, testes are tethered to scrotum distally by the gubernaculum.[1]

Testicular torsion is the most important and common urological emergency.[2] Testicular torsion is the spontenous revolve of the spermatic cord that leads to decrease or totally loss of testicular blood flow. This condition accounts for 7%–30% of cases of acute scrotum.[3] The annual incidence of testicular torsion approximately 3,8 per 100,000 boys under 18 years.[1] Although this conditions are uncommon, it is important to diagnose and rapidly treat with surgical procedure.[4]

The age pattern of testicular torsion is bimodal, it peaks in the neaonatal period and around puberty. In neonatal period, torsion frequently seems extravaginal. In this condition symptoms aren't clear, actually clinic presents as painless scrotal swelling, with or without acute inflammation.[1] Therefore, this unclear symptoms, prepubertal males are under high risk for orchiectomy.[5] One literature review in 18 case a salvage rate found 9%.[6] In pubertal period testicular torsion manifests intravaginal that usually caused bell-clapper deformity (abnormal fixation of tunica vaginalis) and symptoms are more severe than neonates.[1] Not only seen the symptoms in testiscular torsion but also seen in all acute scrotal pathologies. We can categorize this symptoms into 4 subgroup; the painful swollen testicle, painless swollen testicle, the erythematous testicle and traumatic testicle. In these group, there is only one diagnosis that

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should not be missed.[4] Testicular torsion is true surgical emergency in these acute scrotum reasons (Table 1).[1]

The intermittant torsion is other type of testicular torsion. Patients define reccurrent part of acute unilateral scrotal pain. This pain generrally resolves instinctively. After resolving the torsion clinic and imaging results return to normal. It should not be forgotten that this situation can cause segmental ischemia and assure urological treatment.[1]

In this study, it was aimed to evaluate the importance of early diagnosis and appropriate treatment in testicular torsion.

Methods

In order to evaluate addiction studies about testicular torsion managment articles published in the PubMed database between 2000–2021 were examined. The keywords used in the literature review were determined as testicular torsion, testicular torsion managment, salvagable testicule, operation procedures. About this articles that having the key words above were 794 studies. These are examined and 22 review, experimental studies, retrospective studies were included this study.

Results

The researchs about testicular torsion have a lot of information, when this study was planned the studies which contain importance of testicular torsion management considered. 22 studies examined, 5 research highlighted importance timing of application, 2 studies of all mention prepubertal and postpubertal differences of testicular torsion, 3 studies were about acute scrotal emergencies, one of them concluded the operation type after testicular torsion, manual detorsion was told in review, experimental study and retrospective studies. Amount of this studies was 8. Orchiectomy or orchiopexy procedures compaired in 5 studies. These were also retrospective studies. All about studies that mention this condition said same results. Recognazing, timing, emergency operation needing is not ignore any time.

Discussion

Treatment timing is important for testicular torsion. It is important because if torsion has happened in seconds ischemia occured. When ischemia starts in testicule, endotelium produces high volumes of reactive species and small volumes of nitric oxide. It is known ischemia reperfusion injury. This injury can cause necrosis of testicle and leads to permanent testicular impair. This stages last decreased hormone production, infertility and orchiectomy.[7] In recent study on 104 boys in Australia of treatment timing is showed orchiectomy rates are associated timing of patient presentation after symptoms approach. The researchers pointed using of 6 hour cutoff to define early and late appeal to the emergency department and showed that orchiectomy levels increased from 9,1% to 56% before and after the 6 hour application.[16] The application time's importancy highlighted a lot of researches.[2,7,8] The golden time of management after symptom start is suggested to be 4 to 8 hours. If the managment time is after 8 hours testicular function decreases and orchiectomy rate increases.[7]

The other most importance is degree of spermatic cord torsion. This cause is decisive factor of testicule survival after hypoxia induced by arterial construction.[9] There is no many human studies in literature, animal studies highlighting this topic.[10] In recent study of this condition, rabbits were used for torsion. Rabbits start showing mild drops in perfusion at 360 degrees and significantly start decrease at 540 degrees.[11,12] Howe et al.[10] reported that 15 h of symptom duration and 860 degrees of torsion can lead to 50% probability of non-salvage.

About timing of treatment, researchers nowadays looking at a clinical score system called The Testicular Workup for Ischemia and Suspected Torsion (TWIST).[4] In 2012, Barbosa et al.[13] suggested this scoring system as a standardized method of diagnosis (Table 2).

In approval study using the TWIST score among pediatric emergency doctors, a high TWIST score of 7 had a 100% specifity and positive predictive value for testicular torsion.[14,15] When calculation results show high suspicion for testicular torsion, ultrasonography merely delay surgical exploration because ultrasonography is not 100% sensitive. If the results are borderline ultrasonography can chose before exploration.[4]

After diagnosis emergency treatment is mandatory. Manual detorsion, orchiopexy and orchiectomy are options for treatment.

Transcrotal surgical approach is prevalent used to release effective testicule. Detorsion performed until no torsion visible after detorsion testicular viability evaluate. Orchiectomy is made the effected testicule appears necrotic an nonviable. If the effected testes seems viable orchiopexy should be performed. Bell clappel deformity enhances testicular mobility, because of this contrlateral testicule fixed for preventing torsion.[1] In some studies this condition discussed if contrlateral testicule do not fix in same session. Okorie studied about increased infection of syncronous fixation of contrlateral testicule. Therefore some studies remark that, he didn't find any corelation.[16]

Manual detorsion, first described in 1893 by Nash and effectiveness debated but many resorchers said it makes time and comfortable situation before exploration.[2,17,18] Güneş et al.[19] studied on rabbit model if external fixation is made

Table 1. Acute scrotum reasons and diagnosis

Types of acute scrotum	Diagnosis
Epididymoorchitis	Tenderness in testicle or epididyms
	Redness on scrotum
Hematologic disorders	Diffusely hard testicle
Idiopathic scrotal edema	Swelling of scrotal skin
	No signs of enfection
Infection	Tenderness in testicle or epididyms
	Fever
Inguinal hernia or hydrosele	Fluctiation of swelling or mass with activity
Torsion of appendix testicle	Blue dot sign
	Tenderness over the head of the testicle
Torsion of the spermatic cord	High-riding testicle
	Nausea, vomiting
	Palpable rotation in cord
Trauma	Ecchymosis
	Trauma history
Tumor	Hard mass in scrotum
	If metastatic condition is happened, systemic symptoms
Varicocele	Dull, aching pain
	Fluctiation of swelling or pain with activity

without exploration after manual detorsion. This study highligted it can be minimal invasive treatment option.

The cardinal point of all research about diagnosis and treatment modalities of testicular detorsion is preservation of testicular function. Because of ischemia reperfusion mechanism, if management being late after surgery, functional loss and atrophy advance day by day.

Delay in the treatment of torsion is caused by complete necrosis, also in contralateral testicule effect by ischemia reperfusion injury. Infertility may improve in long term follow up. Some studies reported sperm analyses and fertility rates after testicular torsion.[8] Testicular torsion might lead reducing semen quality.[20] Hormonal rates after testicular torsion and management connect with decreased fertility potential. Follicle stimulating hormone (FSH) and inhibin B are useful for fertility advances.[21] Taskinen et al.[8] studied in 13 cases that torsion degrees were from 180 to 900. The median serum inhibin B level at the early follow up visit was higher after testicular detortion than after orchiectomy and FSL level was lower after testicular preservation. At the end they highlighted that fertility prognosis is better after orchiopexy than after orchiectomy. A lot of studies aimed to find cause of contrlateral testicule injury. After researches three main hypotheses found. 1) Ipsilateral reperfusion injury causes vasoconstriction in contralateral testicule and this condition leads hypoxia 2) The torsion of the ipsilateral spermatic cord destroyes blood-testis barrier. This starts an immunological period where immunglobulis have antibody activity against sperm antigens. 3) These immunglobulins that called anti sperm antibodies reduce sperm motility and concentration.[9]

Table 2. TWIST score system

Twist parameter	Score if presents
Testicular swelling	2
Hard testicle	2
High-riding testicle	1
Absent cremasteric reflex	1
Nausea or vomiting	1
Total score	-/7

TWIST: Testicular Workup for Ischemia and Suspected Torsio

When all conclusions of testicular torsion take into consideration, late treatments lead to orchiectomy. In literature, this rate is approximately 30–50% of cases. This results in phychological upset and parental guilt. Management is very important to salvage testis in the other hand promote recognize by patient is also important.[22] In 2016 a study was perforemed about parental awareness was highlighted increased educational affort through schools and healthcare professionals about recognize testicular torsion symptoms.[22]

Conclusion

Testicular torsion management is very important for patiens future life. Many factors can cause testicular impairment. Parental education, timing of application, exploration time and exploration techniques are issues to concidered.

Disclosures

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