

Importance of the testicular torsion in the male infertility

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Acute scrotum

- Torsion of the testis
- Torsion of the appendix testis
- Acute epididymitis
- Epididymo-orchitis
- Other causes
 - Viral orchitis, varicocele, hernia, hematoma, systemic disease, idiopathic oedema,

Testicular torsion

- Torsion of spermatic cord
- Strangulation of the blood supply
- Oedema, ischemia, inflammation
- Fibrosis, atrophy
- Necrosis
- Loss of exocrin and endocrin function

Clinical findings

- Sudden severe pain in testicle
- Swelling of the testicle
- Reddening of the scrotal skin
- Lower abdominal pain,nausea,vomiting
- Swollen,tender,retracted testicle
- Horizontal testicular position
- Color Doppler Sonography: absence of arterial flow



Differential diagnosis

- Acute epididymitis: age, pyuria
- Acute orchitis: mumps, parotitis
- Trauma: findings of injury
- Cryptorchid testis is prone to torsion
- Torsion frequently occurs during sleep

Suspicion of torsion?

Emergency! Immediate action is needed!

Urgent decision about surgical intervention!

Acute treatment

- Manual detorsion (right „unscrewed”, left „screwed up”) and surgical fixation
- Surgical detorsion and bilateral fixation
- Orchiectomy and surgical fixation of opposite testicle
- Testicular biopsy/cryopreservation (?)
- Protective medical treatment (?)

Protective medical treatments

- Traditional empiric treatments
 - Antibiotics
 - Antiinflammatory drugs
 - Infusions, fluid therapy
- Experimental
 - Opioids (morphine)
 - PDE5 inhibitors (sildenafil)
 - Deák et al. Hungarian Urol. 2009/1 18-22
 - Antioxidant therapy

Prognosis

- Degree of torsion
- Spontaneous detorsion?
- Duration of torsion
 - Treatment within 3-4 hours is optimal
 - Recovery is possible within 12-24 hours
 - Preservation doubtful after 24 hours
 - Beyond 48 hours orchiectomy is advised

Consequences of torsion

- Orchialgia
- Testicular cancer risk
- Hypogonadism
- Infertility/subfertility
- Psychologic effect
- Esthetic aspects

Mechanisms of testicular deterioration in torsion

- Cellular hypoxia/ischaemia
- Ischemia/reperfusion injury
- Microcirculation changes
- Leukocyte/endothelin interaction
- Reactive oxygen species (ROS)
- Reactive nitrogen species (RNS)
- Proteolytic enzymes
- Germ cell apoptosis/caspase pathway
 - Hadziselimovic et al 1998 J.Urol 160:1158-1160
- Postinflammatory obstruction

Investigation of microcirculation

- Conventional capillary microscopy
- Intravital Fluorescent Video Microscopy (IVM)
 - large instrument, fluorescence dye
- Laser Doppler Fluximetry (LDF)
 - dynamic parameters can be measured only
- Orthogonal Polarization Spectral Imaging (OPS)
 - measuring of functional capillary density (FCD)

Microcirculation in testicular torsion

- Changes of FCD in torsion
- Measuring with OPS imaging (Cytoscan)
- Animal model (torsion for 60 min)
- Studying human testicular microcirculation
- Future perspectives of OPS imaging
 - Testis sparing surgery/resection
 - To improve surgical sperm retrieval (TESE) success rate

Management of the patients after acute treatment

- Regular long-term follow-up (?)
- Ultrasonography (atrophy, cc.)
- Semen analysis (infertility)
- Hormonal levels (hypogonadism)
- Testicular implant (psych.-esth.)

Infertility/subfertility after torsion

- Subfertility is found in 36-39% of the patients after torsion.
- Semen analysis may be normal in only 5-50% in long-term follow-up
- Early surgical intervention (mean torsion time < 13 hours) with detorsion was found to preserve fertility
- Prolonged torsion periods (mean torsion time of 70 hours) followed by orchiectomy jeopardizes fertility

Causes of infertility after torsion

- Ischemic testicle / atrophized testicle
- Torsion/detorsion causes morphological and biochemical changes by ischemia/reperfusion injury
- Solitary testicle / reduced number of germ cells
- Antisperm antibodies

Treatment of infertility after torsion

- „Medical treatment of male infertility is recommended only for cases of hypogonadotropic hypogonadism”
- „A wide variety of empirical drug treatments of idiopathic male infertility have been used; however, there is little scientific evidence for an empirical approach”

Assisted reproductive techniques (ART)

- Insemination /IVF
- ICSI
- Classical TESE
- Microsurgical TESE /OPS imaging
- Cryopreservation

Summary I.

- Torsion treated either with orchiectomy or preservation of the affected testis, infertility remains a significant sequel
- Ischemic testicle may impair testicular function.
- Mechanisms of cellular injury remain still incompletely understood
- Patients after testicular torsion may benefit from regular long-term follow-up

Summary II.

- Further studies are necessary to determine optimal treatment and management of patients after torsion to prevent loss of testicular functions
- Empiric medical treatments for infertility have been largely replaced by assisted reproduction, mainly by ICSI
- OPS imaging as a new perspective may improve sperm retrieval success rate

