Pathophysiology

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Torsion of the testis is uncommon because the normal testis is anchored and cannot rotate. Extravaginal torsion is seen almost exclusively in neonates because of the increased mobility of the testicle before the descent into the scrotum when attached to the scrotal wall via the tunica vaginalis. Beyond this age, intravaginal torsion occurs as a result of a combination of: /uni25CF High investment of the tunica vaginalis, causing the testis to hang within the tunica like a clapper in a bell (Figure 86.4). This is the most common cause in adoles cents and is typically a bilateral abnormality . /uni25CF Inversion of the testis: the testis is rotated so that it lies transversely or upside down. /uni25CF Separation of the epididymis from the body of the testis, permitting torsion of the testis on the pedicle that connects the testis with the epididymis (Figure 86.4). Normally , when there is a contraction of the abdominal muscles, the cremaster contracts as well. In the presence of one of the abnormalities described above, the spiral a ttachment of the cremaster favours rotation of the testis around the vertical axis. Sudden contraction of the cremasteric muscle, which may - - be a response to mechanical, sexual or thermic stimulation, may cause a rotational e ff ect on the testis as it is pulled upward. Accordingly , straining at stool, lifting of a heavy weight, sexual activity and sport can all precipitate an episode. The two main factors determining damage to the testis are the extent of the twist and the duration of the episode. Twists of 720° cause more rapid ischaemia than twists of 360° or less, and if the testis can be untwisted within 6 hours of the torsion taking place ther e is nearly a 100% chance of testicular salvage compared with a 20% salvage rate if the surgery is delayed for 24 hours. Occasionally the testis untwists spontaneously without sur - gical treatment and 'intermittent' testicular torsion should be considered as a cause of testicular pain in adolescents.

(c) Figure 86.4 Testicular torsion. (a) Normal attachment. (b) An abnor

mally high attachment (arrow) of the tunica vaginalis predisposes to torsion – the 'bell-clapper'. (c) Separation of the testis from the epididymis – torsion about the pedicle between them.

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The veins draining the testis and the epididymis form the pampiniform plexus. The veins gradually join each other as they traverse the inguinal canal and at, or near, the inguinal ring there are only one or two testicular veins, which pass upwards within the retroperitoneum. The left testicular vein empties into the left renal vein while the right empties into the inferior vena cava below the right renal vein. There is an alternative (collateral) venous return from the testes through the cremasteric veins, which drain mainly into the inferior epigastric veins. There are three theories as to the cause of varicoceles: 1 The absence or failure of the antireflux valve usually located where the testicular vein joins the left renal vein or the inferior vena cava on the right. This causes reflux and retrograde flow in the testicular vein. 2 The 'nutcracker' e ff ect that occurs when the left testicular vein gets trapped between the superior mesenteric artery and the aorta. This causes venous compression and testic - ular vein obstruction. 3 Angulation at the junction of the left testicular vein and the left renal vein. In some cases, the dilated vessels are cremasteric veins and not part of the pampiniform plexus. While most varicoceles are idiopathic, obstruction of the testicular vein by a renal tumour varicocele in later life; character - or nephrectomy is a cause of istically , in such cases the varicocele does not decompress in the supine position. The presence of an isolated right-sided vari - cocele is extremely rare. Hence, imaging should be considered . Rarer causes to exclude a retroperitoneal mass in such cases include deep vein thrombosis, renal arteriovenous malforma - ombosis of the pampiniform plexus. tions and thr

(b) Doppler ultrasound of a left varicocele (courtesy of Dr

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Embryologically , the processus vaginalis is a diverticulum of the peritoneal cavity . It descends with the testes into the scro - - tum via the inguinal canal around the 28th week of gestation with gradual closure through infancy and childhood. Structurally , hydroceles are classified into three key types: 1 Communicating (congenital) hydrocele: a patent processus - vaginalis permits flow of peritoneal fluid into the scrotum (tunica vaginalis); associated with indirect inguinal hernias (Figure 86.8a). 2 Non-communicating (vaginal) hydrocele: the processus vaginalis is closed with no communication with the peri - toneal cavity . Instead, fluid accumulation can be due to - excessive production and/or defective absorption by the tunica vaginalis, primarily because of disruption to the lymphatic drainage of scrotal structures (Figure 86.8b). If idiopa thic, these are called 'primary' hydroceles. - 3 The distal end of the processus vaginalis closes correctly , but the mid-portion of the processus remains patent. The proximal end may be open and communicating with the tunica vaginalis, resulting in an 'infantile' hydrocele' (Figure 86.8c), or closed, resulting in a hydrocele of the cord (Figure 86.8d). Non-communicating primary hydroceles are the most common type of hydrocele globally . 'Secondary' hydroceles usually occur in men >40 years and may present acutely from local injury (including torsion), infection, neoplasm or radio - therapy . If a tumour is suspected, the hydrocele should not be punctured (risk of malignant needle-track implantation).

Figure 86.8 (a) Vaginal hydrocele (very common); (b) 'infantile' hydro cele; (c) congenital hydrocele; (d) hydrocele of the cord.

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