Epididymitis
Swollen, sore and infected
Definitions

- Epididymitis – inflammation of the epididymis usually as a result of bacterial or viral infection, rarely as a result of trauma or urinary reflux from the urethra[^1]
- Epididymo-orchitis – inflammation of both the testis and epididymis[^1]
- Orchitis – inflammation of testis due to trauma, ischaemia, metastasis, mumps or infection elsewhere in the body[^1]
A quick review of the anatomy – I’ve highlighted the parts relevant to our topic
Epididymitis

- Acute – pain and swelling < 6 weeks
- Subacute – pain and swelling 6 weeks – 3 months
- Chronic – pain > 3 months can be subdivided – inflammatory, obstructive and epididymalgia\(^2\)

The subdivision of epididymitis into the acute and chronic phase is given over a period of a couple of months.
Acute – pain and swelling < 6 weeks
Subacute – pain and swelling 6 weeks – 3 months
Chronic – pain > 3 months can be subdivided – inflammatory, obstructive and epididymalgia\(^2\)
For an Australian population Chen [3] reported in 2006 an incidence rate of 13 cases per 10000 male patient encounters at the GP. This value is higher for the age cohort 25 – 29 years – 31 per 10000. Similar incidence stats were reported in a UK study by Michel and colleagues[4] of 24 per 10000 for all ages and 27 per 10000 for the 25 – 34 year old cohort.
The aetiology of epididymitis is not well understood but the prevailing theory is that urinary reflux plays a large part. The retrograde passage of urine from the prostatic urethra into the epididymis via the ejaculatory ducts can be caused by congenital defects such as urethral stricture or prostatic dysmorphia, strong Valsalva with a full bladder or mechanical obstructions such as in dwelling catheter or urological instrumentation. The presence of infectious agents is a factor in the exacerbation of the disease process and it is common for concomitant inflammation to occur nearby in the form of prostatitis or urethritis. Since the 1970s it has been assumed that the infectious component has been easily divisible as sexually transmitted infections in the younger adults and a background urologic pathogen in older males. Recent patient database reviews by Nicholson and colleagues has shown this to be myth with the modern older gentleman demonstrated as being just as capable of contracting an STI as their counterparts.
There are a large range of infectious agents that have been implicated in recent studies as being able to migrate into and then cause inflammation of the epididymis. Some of the bacteria you will notice are sexually transmissible (Syphilis, Gonorrhoea, Chlamydia) while others are systemic. Viral infections causing epididymitis are more unusual in that they are normally associated with other parts of the body. Their discovery and implication in epididymitis goes part of the way toward explaining the unusual idiopathic yet fulminant cases reported previously in the literature.
Other Aetiologies

- Trauma
- Obstruction secondary to vasectomy
- Fungal infections such as candida and histoplasmosis
- Rheumatic conditions
  - Parasitic infection such as trichomoniasis and schistosomiasis [5]
  - Can be amiodarone induced [9]
  - Posterior urethral valves in children [10]
  - Xanthogranulomatous inflammation [11, 12]

There are a range of other infectious and inflammatory vectors for epididymitis including mechanical trauma, surgical, fungal, rheumatic, parasitic and pharmacologically induced inflammation. Previously I hinted at congenital posterior urethral valves. Xanthogranulomata are a type of autoimmune disease process where a proliferation of macrophages, a process known as histiocytosis, causes tissue inflammation and replacement with indurated fatty tissue or scar tissue. I’ve put xanthogranulomatous inflammation in a category of its own due to the rather disturbing clinical photos that accompanied the papers that I read on the subject. Rather than share those images I’ll just share my reaction with you..
Infectious agents usually take hold in and are restricted to the tail of the epididymis (limited in ascending to the body and head of epididymis by the epididymal segmentations [13]. This process is certainly not always self limiting - may ascend to the testis becoming epididymo-orchitis.

The disease is typically unilateral in the acute setting however disturbed spermatogenesis and decreased germ cell numbers have been reported bilaterally following unilateral infection[14]

Further progression of disease can lead to abscess formation in the epididymis and / or testis. Segmental infarction is also possible in either testis or epididymis due to bleeding and subsequent tissue compression.[15]

Interestingly there is evidence presented in a literature review by Rusz and colleagues of impact on male fertility even after complete resolution of acute disease – between 6 and 27% of patients reporting azoospermia and 22 – 37% reporting oligospermia in long term follow up studies[14]
Michel and colleagues note that the standard examination of a patient should include investigation on 3 fronts – physical exam, biochemistry and imaging. On palpation pain will be located in the epididymis but maybe difficult to distinguish a precise location if inflammation is widespread i.e. epididymo-orchitis. Palpation can also reveal the presence of induration of the scrotal sac – a process that in severe cases can cause the smoothing of the normally wrinkled scrotal skin. A detailed clinical history including surgery in the area and recent sexual activity should be taken from the patient to ascertain evidence of obstructive conditions or possible infectious vectors.
Urinalysis can reveal imbalances in normal ion levels present in the urine and assist to exclude kidney disease. Cultures taken from the urine or urethral discharge can identify or rule out the pathogen responsible for inflammation. Haematology will show increased generalised inflammatory markers i.e. white cell count and c reactive protein. Interestingly there is no epididymis specific inflammatory marker that has yet been isolated for diagnostic purposes unlike the hepatobiliary markers that we as sonographers are more generally familiar with. Work on this front continues. Some older sources have indicated that semen culture can be useful in identifying other organisms responsible for epididymitis or epididymo-orchitis. With the modern battery of examinations available this is fortunately no longer considered necessary. Can you imagine being asked to give a semen sample while suffering epididymitis?
Acute phase epididymitis has a range of imaging appearances on ultrasound. Interestingly, Pilatz and colleagues identified the most significantly different factor between inflamed and normal tissue was the increased PSV of the testicular artery under Doppler interrogation. More generally the epididymis and its accompanying testis may be thickened or enlarged, the echotexture will be heterogeneous and hypoechoic and colour Doppler will show locally increased vascularity over the epididymis compared to the surrounding tissue. These findings are common in both acute and chronic disease settings. Another common finding in the acute setting is the reactive hydrocele that forms in the scrotum.
Acute Features

Reactive Hydrocoele

Heterogeneous Echotexture

Increased Vascularity
The chronic case will again show thickened or enlarged epididymis, testis and also the tunica vaginalis. Previously mentioned scrotal wall induration will be visualised sonographically. Macrocalcifications are a normal feature of the epididymis and testes but chronic epididymitis or epididymo-orchitis will show widespread coarse calcs throughout the tissue. Infarct can occur with chronic inflammation, although rarely visualised in the epididymis, the common sonographic sign of testicular infarct is the hypoechoic wedge shaped area denoting the loss of an entire functional unit of the testis.
So the question that can come to mind is why we perform these scans – what benefit is there to ultrasound? The primary reason for ultrasound in most cases is to exclude the surgically emergent situation of testicular torsion and this makes up a large part of our referrals for scrotal ultrasound. In cases where torsion is excluded, testicular masses can also be excluded or if found then characterised on ultrasound. If epididymitis is the working imaging diagnosis, ultrasound is useful in visualising the extent of the disease process. Has the inflammation spread to the testis? Is there evidence of abscess formation or tissue infarction.
References

Thank You