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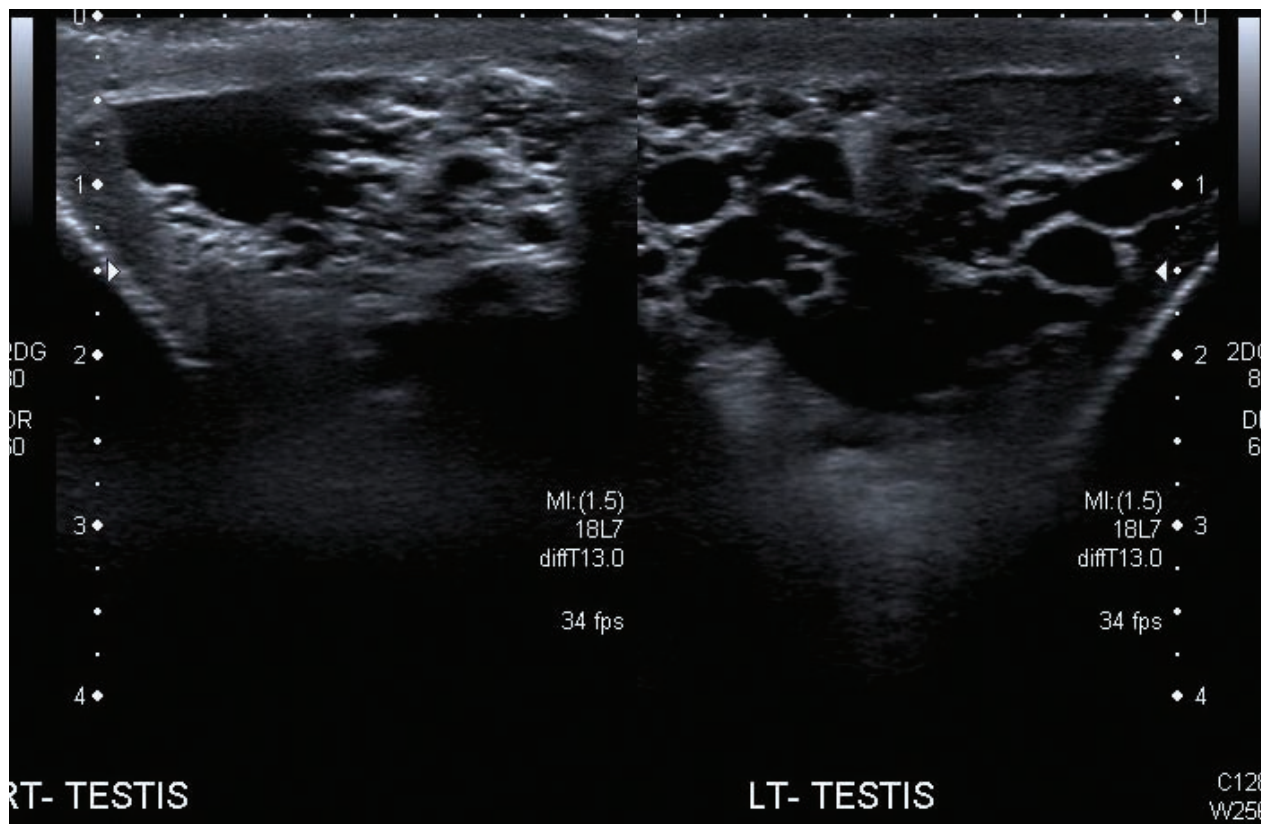


FIGURE 1
Ultrasound scan
demonstrating
a left-sided
varicocoele

What are the causes of varicocoele?

VARICOCOELE IS A COMMON UROLOGICAL CONDITION PRESENT IN 15% OF MEN. THE TERM

varicocoele describes a collection of enlarged veins in the scrotum. Figure 1, above, illustrates the ultrasound appearance of a varicocoele.

Varicocoeles are rare in children; the majority of patients who seek a medical opinion are aged between 15 and 30 and asymptomatic.

Up to 40% of men who present with subfertility¹ may have a varicocoele but although there is an association between varicocoele and impaired semen parameters the majority of men will be

How should patients be assessed?

able to achieve a natural conception without intervention. Most men as a consequence do not require treatment for this condition.

CAUSES

Varicocoele is defined as an abnormal tortuous dilation of testicular veins in the pampiniform plexus. The testicular veins normally travel in the spermatic cord and are neither visible nor palpable.

The precise mechanism by which varicocoeles develop is poorly understood, however the clinical condition is acknowledged to result from venous reflux. The left testicular vein normally drains into the left renal vein, the right testicular vein drains directly into the inferior vena cava, the absence of

What are the management options?

valves in these vessels results in venous reflux and varicocoele formation. The absence of valves is more common on the left side thus approximately 90% of varicocoeles are left sided.

Increased renal vein or testicular vein pressure is another recognised cause of varicocoele, this may result from the angle of venous drainage or multiple pathologies including: retroperitoneal mass; venous thrombus; vena cava occlusion and rarely nutcracker phenomenon (where the renal vein is compressed between the aorta and the superior mesenteric artery).

Table 1**Classification of varicocele according to physical characteristics²**

Grade	Characteristics
III	Palpable and visible
II	Palpable on standing only, not visible
I	Palpable on Valsalva only, not visible
0	Not palpable, not visible (subclinical - diagnosed by ultrasound scan/imaging only)

PRESENTATION AND ASSESSMENT

Most men will present because they are concerned about one of the following problems:

- An asymptomatic scrotal swelling that has been present for a while
- An asymptomatic scrotal swelling associated with a small testicle
- Infertility
- Symptoms of pain or discomfort related to a scrotal swelling
- A sudden finding of a varicocele

A thorough history and examination is essential to make a clinical diagnosis and determine the probable cause. The history should include:

- the amount of time the swelling has been present for
- an assessment of degree of bothersome symptoms
- details of any previous surgery
- fertility

It is important to be alert to the patient with an acutely presenting varicocele or a solitary right-sided varicocele as this may be the first presentation of a retroperitoneal malignancy (usually a renal tumour) especially if the patient is over the age of 40 and the varicocele does not disappear on lying down.

A full abdominal examination including the scrotum should be performed and the patient examined in supine and standing positions.

The Valsalva manoeuvre (ask the patient to strain down) in both positions may make the veins more pronounced. The classical clinical examination finding of a varicocele is described as the sensation of a bag of worms present in the scrotum when the patient is standing or during the Valsalva manoeuvre which disappears on lying down.

Varicoceles may be graded according to the Hudson classification,² (illustrated in table 1, above) and it is important to document the testicular volume.

Measurement of testicular volume is important because 70-80% of the testicular mass consists of seminiferous tubules and the volume represents a measure of the likely quality of spermatogenesis. Normal adult testicular volume is approximately 20 cm³.³

Several methods of estimating

testicular volume exist, all have limitations. Ultrasound assessment is thought to be the most accurate, closely followed by the volume displacement method (measuring the volume of water displaced when a testicle is placed in a container of water). These may be difficult to perform in everyday general practice.

Simpler methods include the use of orchidometers which are practical aids to measure testicle size, perhaps the most well known being the Prader model.⁴ This consists of beads of increasing size with known volume which may be compared with the patient's testicle. Alternatively measurement of the testis, with callipers or a ruler, in three dimensions with the values input into Lambert's equation of $L \times W \times H \times 0.71$ will give an estimate of volume.⁵

In essence though it is only clinically relevant for a GP to identify whether the patient's testicle is small/normal size and in adolescents whether the testicle is failing to develop to an adult size.

MANAGEMENT AND REFERRAL

The majority of varicoceles occur in young healthy men and clinical examination alone is enough to make the diagnosis. Referral to a urologist and further investigations in most of these cases are not required and the patient should be reassured. Supportive underwear may aid patients with small varicoceles complaining of a mild dragging sensation in the scrotum.

Patients in whom an intra-abdominal malignancy is suspected or with significant pain related to their varicocele should be referred to a urologist for review. In these patients a colour Doppler ultrasound scan of the scrotum in lying and standing positions is an appropriate first-line investigation. This may be arranged in primary care at the same time as the referral in order to facilitate the initial secondary care consultation. The radiology department protocol in most centres will automatically include imaging the abdomen to ensure there is no evidence of retroperitoneal pathology when the investigation is requested for varicocele.

Patients with a confirmed renal mass on imaging or a palpable abdominal

mass meet the criteria to be referred urgently under the two-week wait rule.

If an adult patient with a varicocele presents with infertility, a semen analysis should be performed. If the result is abnormal, a repeat sample should be sent and if the abnormality is confirmed, the patient should be referred to a urologist with an andrology interest or the couple should be referred to their local specialist fertility centre.

NICE guidance does not recommend the surgical treatment of varicoceles for infertility.⁶ The controversy regarding varicocele treatment and infertility is detailed below.

There is no evidence that treatment of a varicocele at a younger age will improve fertility compared with intervention later. Adolescents with normal testicular volume on the ipsilateral side of the varicocele should be offered monitoring with measurement and semen analysis.

The European Association of Urology guidelines recommend varicocelectomy in children and adolescents in the following cases:⁷

- Varicocele associated with a small testis with persistent failure of development documented by serial clinical examination
- Patients with a varicocele and an additional testicular condition affecting fertility
- Bilateral palpable varicoceles
- Older adolescents with pathological sperm quality
- Symptomatic varicoceles
- Patients with psychological effects from the appearance of a large varicocele

These patients should be referred for urological review.

VARICOCELE AND INFERTILITY

A quarter of men who have a varicocele may have abnormal semen parameters.⁸ Decreased sperm motility and oligospermia are the most common abnormalities seen.

The mechanism by which varicoceles cause impaired testicular function is poorly understood. Prominent theories include abnormally high scrotal temperature secondary to the increased vascular flow around the testicle and loss of the counter current heat exchange function performed by the normal pampiniform plexus. This temperature increase, which may be as little as 0.6°C, leads to an alteration of Leydig cell function which results in increased sperm DNA damage from oxidative stress.

Reflux of renal and adrenal metabolites from the renal vein and

key points

SELECTED BY

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Varicocele is present in 15% of men. The term describes a collection of enlarged veins in the scrotum. Most patients who seek a medical opinion are aged between 15 and 30 and asymptomatic. Varicoceles may be present in up to 40% of men who present with subfertility, but although there is an association between varicocele and impaired semen parameters most men will be able to achieve a natural conception without intervention.

The precise mechanism by which varicoceles develop is poorly understood, however the clinical condition is acknowledged to result from venous reflux. The absence of valves in the testicular veins is more common on the left side thus approximately 90% of varicoceles are left sided. Increased renal vein or testicular vein pressure is another recognised cause of varicocele, this may result from the angle of venous drainage or multiple pathologies.

A thorough history and examination is essential to make a clinical diagnosis and determine the probable cause. The history should include: the amount of time the swelling has been present for; an assessment of degree of bothersome symptoms; details of previous surgery and fertility. It is important to be alert to the patient with an acutely presenting varicocele or a solitary right-sided varicocele as this may be the first presentation of a retroperitoneal malignancy especially if the patient is over the age of 40 and the varicocele does not disappear on lying down. A full abdominal examination including the scrotum should be performed and the patient examined in supine and standing positions.

The majority of varicoceles occur in young healthy men and clinical examination alone is enough to make the diagnosis. Referral to a urologist and further investigations in most of these cases are not required and the patient should be reassured. Supportive underwear may aid patients with small varicoceles complaining of a mild dragging sensation in the scrotum. Patients in whom an intra-abdominal malignancy is suspected or with significant pain should be referred to a urologist.

NICE guidance does not recommend the surgical treatment of varicoceles for infertility. There is no evidence that treatment at a younger age will improve fertility compared with intervention later. A quarter of men who have a varicocele may have abnormal semen parameters. All patients with a varicocele presenting as part of a couple with fertility problems should be referred to a urologist with a specialist interest in fertility and an expert in assisted reproduction techniques and be counselled regarding the relative success rates of all options: varicocele surgery versus assisted reproduction.

The principles of therapy are to ligate or occlude the internal spermatic veins while preserving arterial flow to the testis from the testicular artery. Surgical techniques or interventional radiology using embolisation or sclerotherapy form the mainstay of treatment.

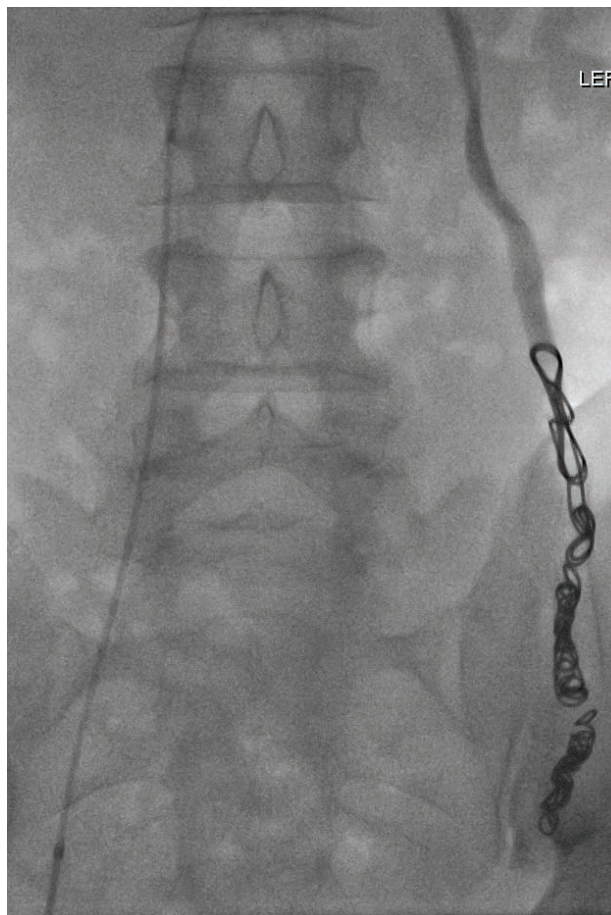


FIGURE 2
Left testicular vein embolised with three coils

Reproduced by kind permission of Dr Mark Thornton, radiology department, Southmead Hospital, Bristol

hypoxia from venous stasis may also contribute to impaired function. In reality the cause is likely to be multifactorial.

Varicocelectomy has been shown to improve semen parameters and reverse sperm damage in several studies.^{9,10} Randomised controlled trials have demonstrated that varicocelectomy for subclinical varicoceles is ineffective.¹¹ Varicocelectomy in men with normal semen parameters who present with infertility is not clinically indicated.¹² Most adolescents with varicoceles will have no problem fathering a child in later life and overtreatment is a real risk.¹³

Controversy remains in the urological community as to whether varicocele repair is warranted in subfertile men. A clear correlation between either intervention or observation alone and increased spontaneous pregnancy rate has not been proven.

Unfortunately, the data published to date demonstrate contradictory results and have significant limitations. Two key meta-analyses have been published recently.

In 2009, Evers and colleagues published a Cochrane review which concluded that there was no evidence

that varicocele repair improved a couple's chance of conception.¹⁴ However, this meta-analysis included several trials where patients had subclinical varicoceles with normal semen parameters which when corrected for suggested a different statistical outcome favouring intervention.

In a more recent meta-analysis of four randomised controlled trials on varicocelectomy in men with a clinical varicocele, oligospermia and unexplained fertility a trend in favour of surgical correction was observed; however this was not statistically significant.¹⁵

Emerging evidence suggests that the timing of varicocele surgery is important and repair should be considered primarily in patients with a clinical varicocele, oligospermia, duration of infertility of at least two years and otherwise unexplained infertility in the couple.¹⁶

The concern regarding varicocelectomy is that there may be more effective measures to overcome infertility. It is therefore reasonable that all patients with a varicocele presenting as part of »

a couple with fertility problems are referred to a urologist with a specialist interest in fertility and an expert in assisted reproduction techniques and be counselled regarding the relative success rates of all options: varicocele surgery versus assisted reproduction technology.

TREATMENT

The principles of therapy are to ligate or occlude the internal spermatic veins while preserving arterial flow to the testis from the testicular artery. Surgical techniques or interventional radiology using embolisation or sclerotherapy form the mainstay of treatment.

All techniques have a failure rate, the primary intervention offered by a centre is dependent on their experience and outcomes. The main complications of intervention are postoperative haematoma, testicular atrophy and hydrocoele formation.

Surgery

Open or laparoscopic techniques may be used to ligate the spermatic veins at different levels above and below the inguinal canal. Although multiple techniques for varicocelectomy have been documented, currently favoured techniques are laparoscopy and microsurgical techniques.

Laparoscopy confers the benefits of minimally invasive surgery and allows the testicular vein to be taken proximally where it inserts into the renal vein or inferior vena cava, where there are fewer vessels to ligate (recurrence rates 3-7%).¹⁷ Microsurgical varicocelectomy, using magnification during surgery for example an operating microscope, allows optimal visualisation of small vessels and reduced risk of arterial ligation (recurrence rate 0.8-4%).¹⁸ Lymphatic-sparing surgery minimises the risk of postoperative hydrocoele.

Postoperative advice will vary between centres but generally dressings may be left on for up to 48 hours, patients may return to nonstrenuous work after two days with analgesia and it is wise to advise patients to refrain from intercourse for a week.

Interventional radiology

Embolisation is the least invasive method of varicocele treatment. It may be performed under sedation and is favoured by many centres. A catheter is inserted via the right femoral vein or internal jugular vein and passed into the spermatic vein under radiological screening. Venography is used to identify collateral vessels, embolisation is then performed using coils (see figure 2, p19)

or less commonly a sclerosant (recurrence rate up to 10%).¹⁹ Misplacement of coil or coil migration are recognised additional complications.

CONCLUSION

The management of men with varicoceles is largely conservative. Patients suspected of having underlying malignant pathology or with significant discomfort from a large varicocele should be referred for specialist review.

The data regarding the relationship between varicocele and infertility is inconclusive. NICE does not recommend the surgical treatment of varicocele for subfertile men. Patients or couples with infertility should be referred to a urologist with a specialist interest in fertility and an expert in assisted reproduction techniques, ideally to be seen in a joint clinic. Patients can then be counselled regarding the relative success rates of all options for varicocele surgery versus assisted reproduction.

REFERENCES

- 1 Cockett ATK, Takihara H, Consentino MJ. The varicocele. *Fertil Steril* 1984;41:5-11
- 2 Hudson RW, Perez Marrero RA, Crawford VA et al. Hormonal parameters in incidental varicoceles and those causing infertility. *Fertil Steril* 1986;45(5):692-700
- 3 Kim ED, Lipshultz LJ, Howard SS. Male infertility. In Gillenwater JY, ed. *Adult and Paediatric Urology*. Lippincott Williams & Wilkins. Philadelphia, PA, 2002
- 4 Prader A. Testicular size: assessment and clinical importance. *Triangle* 1966;7:240-243
- 5 Lambert B. The frequency of mumps and of mumps orchitis and the consequences of sexuality and fertility. *Acta Genet Stat Med* 1951;2(suppl 1):1-166
- 6 National Institute for Health and Clinical Excellence. CG11. Fertility: assessment and treatment for people with fertility problems. NICE. London. 2004
- 7 Tekgul S, Riedmiller H, Dogan HS et al. European Association of Urology Guidelines on Paediatric Urology. [www.uroweb.org/gls/pdf/21_Paediatric_Urology_LR%20\[correctie%20Hoebcke\].pdf](http://www.uroweb.org/gls/pdf/21_Paediatric_Urology_LR%20[correctie%20Hoebcke].pdf)
- 8 The influence of varicocele on parameters of fertility in a large group of men presenting to infertility clinics. World Health Organization. *Fertil Steril* 1992;57(6):1289-93
- 9 Zini A, Dohle G. Are varicoceles associated with increased deoxyribonucleic acid fragmentation? *Fertil Steril* 2011;96(6):1283-7
- 10 Agrawal A, Deepinder F, Cocuzza M et al. Efficacy of varicocelectomy in improving semen parameters: a new meta-analytical approach. *Urology* 2007;70(3):532-8
- 11 Grasso M, Lania C, Castelli M et al. Low grade left varicocele in patients over 30 years old: the effect of spermatic vein ligation on fertility. *BJU Int* 2000;85(3):305-7
- 12 Breznik R, Vlaisavljevic V, Borko E. Treatment of varicocele and male fertility. *Arch Androl* 1993;30(3):157-160
- 13 Zargooshi J. Sperm count and sperm motility in incidental high-grade varicocele. *Fertil Steril* 2007; 88(5):1470-3
- 14 Evers JH, Collins J, Clarke J. Surgery or embolisation for varicoceles in subfertile men. *Cochrane Database Syst Rev* 2009;(1):CD000479
- 15 Baazeem A, Belzile E, Ciampi A et al. Varicocele and male factor infertility treatment: a new meta-analysis and review of the role of varicocele repair. *Eur Urol* 2011;60(4):796-808
- 16 Giagulli VA, Carbone MD. Varicocele correction for infertility: which patients to treat? *Int J Androl* 2011;34(3): 236-241
- 17 Miersch WD, Shoenich G, Winter P et al. Laparoscopic varicocelectomy: indication, technique and surgical results. *Br J Urol* 1995;76(5): 636-8
- 18 Jungwirth A, Gogus C, Hauser G et al. Clinical outcome of microsurgical subinguinal varicocelectomy in infertile men. *Andrologia* 2001;33(2):71-74
- 19 Lenk S, Fahlenkamp D, Glicch V et al. Comparison of different methods of treating varicocele. *J Androl* 1994; 15(Suppl):34S-37S

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