

Obstetric anal sphincter injury

Danielle Abbott,¹ Natalie Atere-Roberts,² Andrew Williams,¹ Eugene Oteng-Ntim,¹ Lucy C Chappell³

¹Guy's and St Thomas' NHS Foundation Trust, London SE1 7EH

²Oxford Radcliffe Hospitals NHS Trust, Headington, Oxford OX3 9DU

³King's College London, London SE1 7EH

Correspondence to: L Chappell lucy.chappell@kcl.ac.uk

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Anal sphincter injury during childbirth is a leading cause of anal incontinence. In a study of more than 20 000 consecutive vaginal deliveries, clinically diagnosed obstetric anal sphincter injury occurred in 2.9% of primiparous women and 0.8% of multiparous ones.¹ Of women who have sustained such an injury, 60-80% are asymptomatic at 12 months, of whom most report incontinence of flatus only, rather than faeces.^{2 w1 w2} Establishing a correct diagnosis at time of injury will facilitate adequate repair and may prevent future incontinence.³ In one epidemiological study, only a third of people with faecal incontinence had ever discussed the problem with a doctor because of embarrassment or fear of stigma.⁴ This review outlines the determinants, diagnosis, and management of obstetric anal sphincter injury. Women affected by obstetric anal sphincter injury require acute management at the time of delivery, together with follow-up or referral when newly presenting with symptoms months or years after childbirth. This review is relevant to all who provide care during childbirth and to doctors and healthcare professionals to whom women may subsequently present.

What is obstetric anal sphincter injury and how can it be recognised?

Both third and fourth degree perineal tears (box 1) result in injury to the anal sphincter. A third degree perineal tear is defined as a partial or complete disruption of the anal sphincter muscles,^{5 w3} and it can affect the external anal sphincter (circular fibres) or the internal anal sphincter (longitudinal fibres), or both (fig 1A). A fourth degree tear is defined as a disruption of the anal sphincter muscles with a breach of the rectal mucosa (fig 1B).^{5 w3} A thorough clinical examination of the perineum and vagina, including a digital rectal examination, should be performed after

SUMMARY POINTS

Obstetric anal sphincter injury affects about 2.9% of primiparous women who deliver vaginally
Of women who have sustained such an injury, 60-80% are asymptomatic at 12 months, of whom most report incontinence of flatus only
Most women with faecal incontinence will not volunteer this information unless asked, so midwives, health visitors, obstetricians, and general practitioners should be aware of the problem and take a careful history
Affected women should be referred to a perineal clinic for further investigation with endoanal ultrasonography and manometry

SOURCES AND SELECTION CRITERIA

We searched Medline and PubMed from 1980 to 2009, focusing on evidence based publications on obstetric anal sphincter injury and randomised trials for management of such injury. We supplemented these sources with selected systematic reviews and good quality prospective observational studies. Additional information cited includes evidence based guidelines and published consensus statements.

every vaginal delivery to improve the detection rate of anal sphincter injury.⁶ Visual inspection should be combined with palpation, including a pill rolling movement using the index finger in the rectum and the thumb over the anal sphincter to assess muscle bulk.⁶

How many women get it?

It is difficult to estimate the true incidence because of the variety of tools used to identify injury (including clinical examination, patient questionnaire, endoanal ultrasonography, and anal manometry) and the lack of consensus as to what constitutes the "gold standard." In addition, the denominator population reported in the literature varies. Because anal sphincter injury depends on several risk factors (box 2), inclusion or exclusion of certain groups of women with such features will influence the reported incidence. More recent use of endoanal ultrasonography at the time of delivery has led to higher reported incidences of defects in the anal sphincter (ranging from 11%⁷ to 36%⁸), but it is unclear whether these represent clinically relevant defects. The largest study using clinical examination at the time of delivery reported obstetric anal sphincter injury in 1.7% of women.¹

Box 1 | Classification of anal sphincter injury^{w3}

First degree: injury to perineal skin only
Second degree: injury to perineum that affects the muscles but not the anal sphincter
Third degree: injury to perineum that affects the anal sphincter complex:
3a: Less than 50% of external anal sphincter torn
3b: More than 50% of external anal sphincter torn
3c: Both external and internal anal sphincter torn
Fourth degree: injury to perineum involving the anal sphincter complex and anal epithelium

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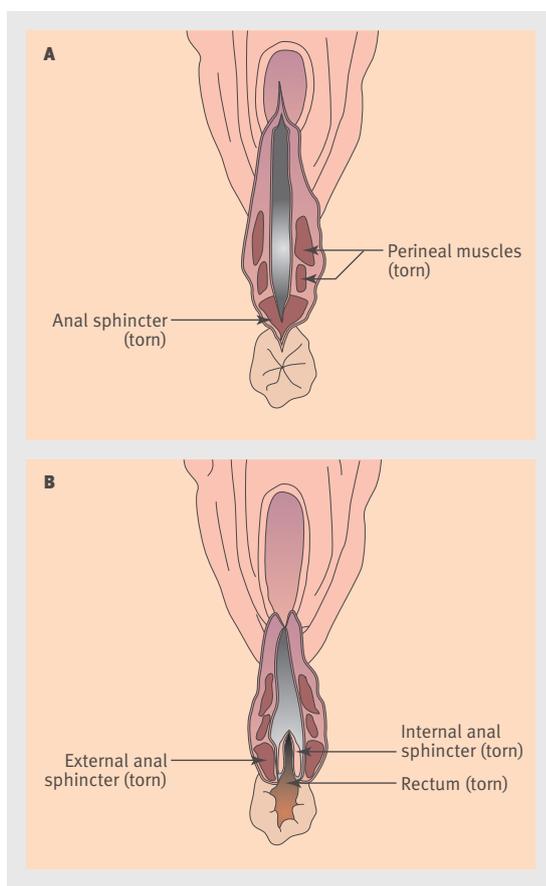


Fig 1 | (A) Third degree tear affecting the anal sphincter; (B) fourth degree tear extending to the anal mucosa

Why might the incidence be underestimated?

Anal sphincter injuries may not be recognised or may be incorrectly classified by a doctor or midwife, possibly because of poor understanding of perineal anatomy or the perineal injury classification system. In one study that audited the anatomical knowledge of doctors and midwives, 41% of medical trainees and 16% of midwives incorrectly classified a partial or complete tear of the external anal sphincter as “second degree.”¹⁰ Sphincter injuries may be under-documented if reporting them (as is standard in many healthcare systems) leads to blame of an individual, rather than analysis of the events that led to the injury. Genuine “occult” anal sphincter injuries are those that cannot be detected on clinical examination alone but that are identified by subsequent endoanal ultrasound. A recent study reported that true occult anal sphincter injuries occurred in only 1.2% of 254 women, a much lower proportion than was previously reported.¹¹

What are the risk factors for obstetric anal sphincter injury?

A systematic review identified several risk factors associated with obstetric anal sphincter injury (box 2).⁹ Instrumental delivery (particularly by forceps), shoulder dystocia, and prolonged second stage of labour confer the greatest increased risk of sphincter injury, but these events may be unavoidable or preferable to alternatives, such as a difficult caesarean section at full dilatation. Data

on episiotomy are conflicting, with some studies reporting protective effects and others reporting the opposite. If an episiotomy is indicated, a mediolateral approach is associated with a lower incidence of sphincter injury than a midline incision (2% v 12%),¹² but routine episiotomy is not recommended as a way to prevent anal sphincter injury.¹³ High infant birth weight is also an independent risk factor for the development of obstetric anal sphincter injury,⁹ but antenatal prediction of birth weight can be inaccurate even with ultrasonography, which has a 10-20% error rate at term. Although the authors of a case-control study attempted to develop a clinical risk scoring system for prediction of sphincter injury, this tool performed poorly, perhaps because each factor makes only a small contribution towards overall risk.¹⁴

How is obstetric anal sphincter injury managed after childbirth?

Repair of the anal sphincter

The guidelines of the Royal College of Obstetricians and Gynaecologists recommend that third and fourth degree tears are repaired within a few hours of delivery in an operating theatre under regional or general anaesthesia by an appropriately trained clinician.⁵ Primary repair of the external anal sphincter (in the immediate postpartum period) uses either an “end to end” (fig 2A) or “overlapping” (fig 2B; fig 3) surgical technique and is most often performed by an obstetrician. The internal anal sphincter should also be identified and repaired if necessary (fig 2C). A secondary repair—one that is performed to treat faecal incontinence months or years after delivery—is usually performed by a colorectal surgeon.

What is the optimum method of repair?

The evidence now points to the overlapping technique being the best option for repair. The recent Cochrane review of repair methods analysed three trials with a total of 279 women.³ Meta-analyses found no differences in perineal pain or flatus incontinence between the two repair techniques at 12 months, but the group sutured using the overlapping approach had a lower incidence of faecal urgency and a lower anal incontinence score. Symptoms of anal incontinence were also less likely to worsen over 12 months with this technique.³

A PATIENT'S PERSPECTIVE

When I first went to the third degree clinic it was just good to speak to people who could explain my injury, understand the problems I was still experiencing, and reassure me that it could get better. Of course it was upsetting to have intrusive tests, and early on it was distressing to hear how weak my pelvic floor was. But from the first meeting I was given simple advice that was easily put into practice and that immediately improved my quality of life. I used to avoid situations that could trigger problems, and I worried about my return to work and having another baby, but the support I received from the clinic and subsequent physiotherapy made things normal again. Of all the good care I received throughout my pregnancy and with my young baby, this is the treatment that restored my good health and my dignity.

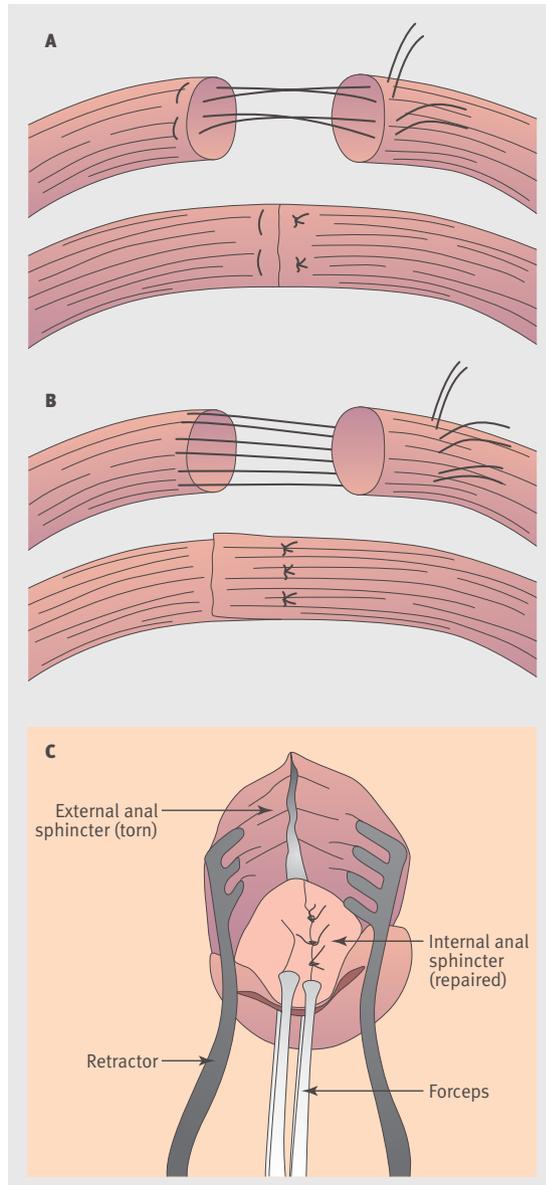


Fig 2 | (A) End to end technique; (B) overlapping technique; (C) repair of the internal anal sphincter

Additional treatment: antibiotics and laxatives

Evidence from a randomised trial of women with sphincter injury showed that those who received prophylactic antibiotics (second generation cephalosporin) at the time of repair had a lower rate of perineal wound infection at two weeks postpartum and a lower incidence of purulent discharge from the wound.¹⁵ Perioperative antibiotic prophylaxis is recommended by the Scottish Intercollegiate Guidelines Network with the aim of preventing repair breakdown.^{w4} The use of laxatives is associated with an earlier and less painful bowel motion and earlier discharge from hospital compared with a constipating regimen.¹⁶ Addition of a bulking agent to a laxative regimen resulted in more incontinence in the early postnatal period and is not recommended.¹⁷ In a recent national practice survey 94% of obstetricians recommended laxatives.^{w5} On discharge women are given advice on general hygiene, on pelvic floor exercises, and on how to avoid constipation by a physiotherapist; this policy is based on general good practice with no strong evidence base.

How should third and fourth degree tears be followed up?

The optimal timing and length of follow-up is not clear and no controlled trials have compared different practices. The Royal College of Obstetricians and Gynaecologists recommends that women are offered physiotherapy and pelvic floor exercises for six to 12 weeks after anal sphincter repair,⁵ and that they should also be reviewed six to 12 weeks after delivery by a consultant obstetrician or gynaecologist, preferably in a dedicated multidisciplinary perineal clinic. Fewer than two fifths of all UK obstetricians provide follow-up for longer than six weeks for women who have undergone primary repair, and only 10% provide follow-up beyond six months.^{w5} Abnormal symptoms may not have manifested by six weeks, and symptoms often worsen over time.¹⁸ The role of endoanal ultrasound is uncertain; residual defects may persist in 29-36% of women who have had a primary sphincter repair,^{w3} but the relevance of this in the context of an asymptomatic patient is unclear.

Tools for assessing the problem

A standardised and validated questionnaire (figure on bmj.com), such as those used by specialist perineal clinics,

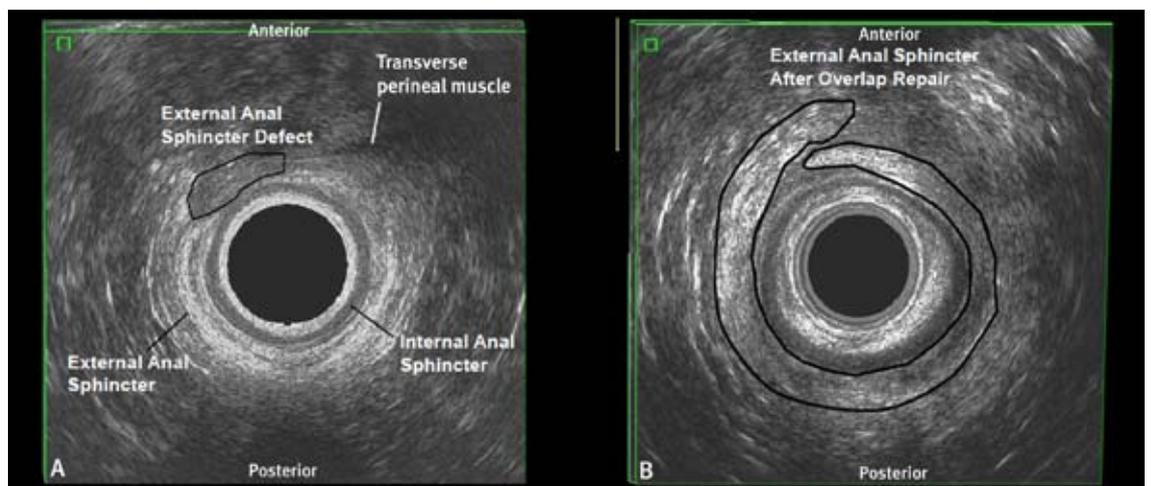


Fig 3 | (A) A preoperative endoanal ultrasound scan showing an external anal sphincter defect at 12 o'clock; (B) a postoperative endoanal ultrasound scan showing an "overlapping" repair of the external anal sphincter

Box 2 | Risk factors for obstetric anal sphincter injury⁹**Antenatal risk factors**

Birth weight >4000 g
 Persistent occipitoposterior position
 Nulliparity

Induction of labour

Intrapartum risk factors

Epidural analgesia
 Second stage of labour longer than one hour
 Instrumental delivery
 Midline episiotomy

Box 3 | Persistent sphincter defects after third and fourth degree tears**Symptoms**

Perineal pain
 Dyspareunia
 Incontinence of flatus
 Faecal urgency
 Incontinence of faeces

Signs

Faecal soiling
 Asymmetry of anus with voluntary or reflex contraction (coughing)
 Little or no anal sphincter tone on rectal examination

Complications*Short term*

Wound haematoma
 Wound breakdown
 Abscess formation
 Anal incontinence

Long term

Anal incontinence
 Rectovaginal fistulas

Box 4 | Management of women with persistent symptoms after primary repair

All women should be referred to secondary care for further investigation to detect persistent anal sphincter defects once common causes have been identified and treated

Conservative approaches

Avoidance of high fibre foods, spicy foods, and food with a high caffeine content

Treatment with bulking agents and constipating agents such as loperamide or codeine phosphate

Use of anal plugs

Physiotherapy to increase the strength of pelvic floor muscles and increase the anorectal angle, which contributes to bowel control

Bowel training, which is similar in concept to bladder training; patients learn to resist the urge to open their bowels, gradually increasing the time over which this can be done

Biofeedback retraining, which is a learning strategy that teaches subjects how to control biological processes (in this instance, strengthening anal sphincter contractions by viewing the readout from a pressure-sensitive probe in the anus); it has been shown to be effective in short term symptom control even in the presence of structural anal sphincter damage²³

Sacral nerve stimulation²⁴

Surgical approaches

Secondary repair by a specialist colorectal surgeon

Box 5 | Training objectives to improve outcomes after obstetric anal sphincter injury**Acute setting**

Improve knowledge of perineal anatomy in midwives and trainee obstetricians

Encourage a thorough examination of the perineum after every delivery by a doctor or midwife

Improve midwives' and obstetricians' understanding of the diagnosis and classification of obstetric anal sphincter injury

Mandatory obstetric anal sphincter repair courses for all obstetric trainees

Family health physicians and general practitioners

Increase primary care providers' awareness of the scale of the problem

Increase primary care providers' vigilance in looking for symptoms of anal sphincter injury after childbirth

may help assess the severity and the impact of the problem.^{w6} Women with incontinence or pain at follow-up should be referred to a specialist gynaecologist or colorectal surgeon for endoanal ultrasonography and anorectal manometry.^{w5} Routine assessment of all women with tears or symptoms of faecal incontinence postpartum at a perineal clinic increases detection of missed injuries.^{w7} A small proportion of women may need referral to a colorectal surgeon for a secondary sphincter repair, but the incidence of this is not well documented. Management of faecal incontinence has been discussed recently in a *BMJ* clinical review.¹⁹

Managing problems associated with obstetric anal sphincter injury

Obstetric anal sphincter injury is associated with short and long term symptoms, signs, and complications (box 3) that can have physical and psychological effects. Anal incontinence has been described as "faecal or flatus incontinence which is a social or hygienic problem."^{w3} An anal sphincter defect that is accompanied by symptoms in the early postpartum period and is detectable on endoanal ultrasound is an important predictor of long term faecal incontinence.^{18 20} Urgency of stool resulting in a rush to the toilet and urge faecal incontinence are thought to indicate damage to the external sphincter, whereas the passive leakage of faeces or flatus is associated with internal sphincter damage. Overflow incontinence can occur in women with a history of constipation or those who fear pain associated with the passage of stool.

What is the prognosis for these patients?

Although initial studies reported high rates of incontinence after obstetric anal sphincter trauma, studies (including two randomised controlled trials) in the past 10 years have been more encouraging, with 60-80% of women being asymptomatic at 12 months.^{2 w1 w2} Of those remaining symptomatic, most (59%) report incontinence of flatus only.²¹ Box 4 provides the options available for the management of women with persistent symptoms after primary repair. Improved repair techniques and recognition of internal anal sphincter disruption may have led to a true improvement, but differences in the assessment of incontinence make it difficult to

UNANSWERED QUESTIONS

Should all women with obstetric anal injury have a routine endoanal ultrasound scan?

Should we use endoanal ultrasound routinely in the delivery unit to identify occult anal sphincter injury?

What is the best method of repair—the end to end approach or the overlap one?

What is the best mode of delivery after previous obstetric anal sphincter injury; can we improve our prediction of who will benefit from caesarean section?

TIPS FOR NON-SPECIALISTS

At the six week postnatal check ask about symptoms of flatus or faecal incontinence because women may not reveal such symptoms voluntarily

Referral to a regional dedicated multidisciplinary perineal or pelvic floor clinic is optimal

Referral to a specialist gynaecologist or colorectal surgeon is an appropriate alternative

Refer women to a dedicated pelvic floor physiotherapist if symptoms persist

compare studies directly. After a secondary repair, long term continence improves in 58% of women.²²

What influences the prognosis?

Insufficient understanding of perineal anatomy might prevent the correct identification of the torn ends and their reapproximation.¹⁰ Residual defects in the sphincter may also partly be caused by retraction of the torn ends owing to continual tonic contraction of the sphincter.⁶ The development of anal incontinence is multifactorial, however, and oestrogen deficiency, obesity, perineal descent, ageing, and pudendal nerve neuropathy may compound the problem.²⁵

What is the advice for future deliveries?

The absence of systematic reviews or randomised controlled trials means that the preferred method of delivery after obstetric anal sphincter injury is still unclear. Studies have shown that faecal symptoms worsened in 17–24% of women who had a vaginal delivery after a previous third degree tear.^{26 w8 w9} Recommendations suggest that women with obstetric anal sphincter injury should be counselled about the potential worsening of symptoms after a subsequent vaginal delivery⁵ and be warned that sphincter injury with further neuropathy in subsequent deliveries may worsen or unmask symptoms.²⁷ However, a recent prospective observational study found no significant change in any of these parameters 13 weeks after repeat vaginal delivery in women with previous anal sphincter injury without objective evidence of anal sphincter dysfunction measured by a standardised health questionnaire, anal ultrasound, and manometry.²⁸

What is the role of caesarean section?

It is not clear whether caesarean section can prevent the development of anal incontinence in women with previous obstetric anal sphincter injury. Caesarean section may protect against anal sphincter injury if performed electively or at an early stage of labour but may not protect against symptoms caused by pudendal nerve neuropathy. Anal incontinence

ADDITIONAL EDUCATIONAL RESOURCES**Additional resources for healthcare professionals**

National Institute for Health and Clinical Excellence. Faecal incontinence: the management of faecal incontinence in adults. 2007. www.nice.org.uk/CG49

Royal College of Obstetricians and Gynaecologists. Management of third- and fourth-degree perineal tears (green-top 29). 2007. www.rcog.org.uk/womens-health/clinical-guidance/management-third-and-fourth-degree-perineal-tears-green-top-29

Additional resources for patients

Royal College of Obstetricians and Gynaecologists. A third- or fourth-degree tear during childbirth. 2008. www.rcog.org.uk/womens-health/clinical-guidance/third-or-fourth-degree-tear-during-childbirth

National Institute for Health and Clinical Excellence. CG49 Faecal incontinence (bowel control problems): understanding NICE guidance. 2007. <http://guidance.nice.org.uk/CG49/PublicInfo/pdf/English>

Bladder and Bowel Foundation (www.bladderandbowelfoundation.org/)—UK based charity website providing range of information on bladder and bowel problems, treatments, and incontinence products

can develop in women after elective and pre-labour caesarean sections.²⁹ Furthermore, caesarean section is associated with increased morbidity and mortality, consequences for future deliveries, and financial burden to healthcare services. A randomised controlled trial is needed to investigate the optimal mode of delivery after obstetric anal sphincter injury. Because of these inconsistencies, the clinician should discuss the risks and benefits of potential modes of delivery and the uncertainties inherent with any planned mode of delivery.

Training

The best way to increase the recognition and diagnosis of obstetric anal sphincter injury is to increase awareness about this problem and its consequences among healthcare professionals (box 5). In the acute setting, thorough examination of the perineum by midwives and doctors is essential to enable immediate and appropriate reconstruction.^{w10} Of 497 doctors (84% trainees) attending an international hands-on workshop on management of obstetric anal sphincter injury, more than 80% of participants thought that their training before performing repairs independently was unsatisfactory. After attending this workshop, more obstetricians identified and repaired the internal sphincter correctly.³⁰ In primary care, increased awareness of this problem should trigger general practitioners to refer women with faecal incontinence, urgency of less than 15 minutes, or any symptoms of anal incontinence after six months postpartum to a dedicated pelvic floor clinic.

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Patient consent obtained.

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ANSWERS TO ENDGAMES, p 155. For long answers go to the Education channel on bmj.com

ON EXAMINATION QUIZ

Dermatology

- 1 Answer J is correct
- 2 Answer H is correct
- 3 Answer G is correct
- 4 Answer B is correct
- 5 Answer A is correct

STATISTICAL QUESTION

Survival (time to event) data II

Answers *a* and *b* are true; *c* and *d* are false.

CASE REPORT

Sprouting a warfarin interaction

- 1 Warfarin inhibits the enzyme vitamin K epoxide reductase and thus prevents recycling of oxidised vitamin K. This lowers the amount of reduced vitamin K available, which, in turn, prevents carboxylation and activation of clotting factors dependent on vitamin K (such as II, VII, and IX).
- 2 Possible causes of raised INR typically include incorrect dosing and the use of broad spectrum antibiotics, although causes are often multifactorial. This patient's raised INR, however, was likely to be diet related, in particular given that she was on a high maintenance dose of warfarin. On direct questioning, the patient reported very high intake of sprouts and cabbage, both recognised as having high levels of vitamin K. The change in diet associated with hospitalisation dramatically reduced dietary vitamin K, resulting in a markedly increased INR.
- 3 A raised INR should initially be managed with normal resuscitation measures, as appropriate. Depending on the clinical situation, specific management of overcoagulation may involve simply withholding warfarin until the dose is within therapeutic range or using oral or intravenous vitamin K. In severe life threatening cases, the use of prothrombin complex is recommended, although liaison with a haematologist is advised.
- 4 All warfarin schedules should be tailored to the individual. Two initial doses of 2.5-5 mg would be appropriate in this patient, with subsequent doses based on the change in INR. Low molecular weight heparin should be used to "bridge" anticoagulation until the INR is stable, reducing the chance of recurrent thromboemboli.