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REVIEW

Obstetric management following fertility-sparing radical vaginal trachelectomy for cervical cancer

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Summary

Radical vaginal trachelectomy now affords a fertility-sparing procedure for the treatment of early-stage cervical cancer in young women. Subsequent obstetric management within this group of women remains a challenge to the obstetrician, with risks of premature labour a continuing probability throughout pregnancy. Here we describe four cases of successful pregnancy following radical vaginal trachelectomy within our unit. The merits of early antenatal intervention, regular lower uterine segment length monitoring and use of daily progesterone pessaries are discussed, alongside the current supportive evidence. We conclude with a discussion of proposed recommendations for obstetric management of pregnancy in women post-radical vaginal trachelectomy.

Keywords

General obstetrics, oncology, intrapartum care

Introduction

Modern treatment for early stage cervical cancer has been transformed and now includes fertility-sparing radical vaginal trachelectomy (Farthing 2006). In the UK, almost 1000 women under the age of 40 are diagnosed with cervical cancer each year (Cancer Research UK 2006). Radical hysterectomy with bilateral pelvic lymphadenectomy is the traditionally recommended surgical management of FIGO stage 1b1 cervical cancer, with reported 5-year survival rates of 80–90% (Farthing 2006; Kay et al. 2006). However, this surgery results in infertility (Farthing 2006). Alternatively, fertility preservation can be considered in such patients if, after treatment to the cervix; the uterus, tubes and ovaries are conserved (Acheson 2008). D'Argent first described the technique of radical trachelectomy in 1994 (D'Argent et al. 1994). The procedure involves removal of the cervix and parametrial tissue, following laparoscopic bilateral pelvic node dissection. Disease should be small volume (<2 cm) with no extension into the parametrium or endocervix. Recurrence rates are low in this select population, and the 5-year survival rate is >95% (Shepherd et al. 2001; 2006). Since the first description of the technique, more than 700 cases have been reported, including several series of more than 50 patients (Acheson 2008).

Despite increasing technical experience in the performance of radical vaginal trachelectomies, subsequent obstetric management remains challenging (Shepherd et al. 2006; Jolley and Wing 2008). For many patients, the subsequent pregnancy is managed in a centre remote from the team who performed the radical trachelectomy. Very few

publications to date describe pregnancy management after trachelectomy, and no standardised protocol has been agreed.

Here we examine the management of three cases of successful pregnancies following radical vaginal trachelectomy for stage 1b1 cervical cancer, and one case of a pregnancy following partial vaginal trachelectomy. Each case raises several issues regarding obstetric management.

Case report 1

A 31-year-old nulliparous woman was referred with possible cervical glandular intraepithelial neoplasia (CGIN). A large loop excision of the transformation zone (LLETZ) procedure showed moderately- to poorly-differentiated adenocarcinoma of the cervix (Grade 1b1). Histology showed that the depth of invasion was at least 4.5 mm and likely to measure 7 mm in the horizontal dimension. Magnetic resonance imaging (MRI) showed no extra-cervical disease spread and no lymph node enlargement. She subsequently underwent a radical vaginal trachelectomy and laparoscopic pelvic lymphadenectomy. A cervical length of 2.5 cm was removed, and a purse-string cerclage suture inserted into the isthmus. There was no residual tumour seen in the trachelectomy specimen.

Her postoperative vaginal isthmus smear was normal at 2 months. At 6-months follow-up, her colposcopic investigations were normal. She conceived naturally 2 years following surgery. Delivery was planned for 34–36 weeks' gestation by classical caesarean section. She was prescribed 200 mg twice-daily progesterone pessaries at 12 weeks'

gestation onwards and arrangements were made for regular transvaginal monitoring of her lower uterine segment, beginning at 16 weeks. At 19 weeks, her cervical length measured at 12 mm with no funnelling.

The patient was given betamethasone intramuscularly at 25 weeks following an admission with threatened labour. At 29 weeks' gestation, although the cervix had shortened to 9 mm without funnelling, she was experiencing no tightening or vaginal loss (Figure 1). At 33+3 weeks, she presented to the labour ward with a history of premature rupture of membranes. A classical caesarean section was performed the same day with the delivery of a healthy baby girl weighing 2,110 g. The baby was transferred to the neonatal unit and made a good recovery. Mother and baby were discharged 2 weeks post-delivery.

Case report 2

A 29-year-old nulliparous woman, was diagnosed with early cervical adenocarcinoma stage 1b found on loop biopsy. MRI showed a 1 cm high signal area confined to the cervix with no evidence of parametrial extension. It also showed an 8–9 mm soft tissue opacity along the right pelvic wall, suggestive of a small lymph node. She underwent a radical trachelectomy and pelvic lymphadenectomy with insertion of a Prolene cerclage suture into the isthmus. Lymph nodes were negative at histology and there was no evidence of residual disease. During follow-up she complained of dyspareunia and painful periods. Laparoscopic investigations showed an area of endometriosis on the bladder and some mild thickening of the right utero-sacral ligament. She underwent gentle dilatation of the cervix to alleviate menstrual cramps and increase menstrual flow.

This patient conceived naturally 3 years following her trachelectomy procedure. At 13 weeks' gestation she was commenced on progesterone pessaries, 200 mg twice daily and serial cervical scans were booked. At her 13-week scan, the cervical length was measured at 15 mm with no obvious funnelling.

She experienced some vaginal bleeding at 17 weeks' gestation, which resulted in two admissions to hospital. Cervical length remained stable at 5–6 mm, but at this point there was evidence of a sub-chorionic haematoma with a posterior placenta, which resolved by the 18-week scan. She was admitted to hospital and prescribed dalteparin with mechanical stockings as thromboprophylaxis.



Figure 1. Transvaginal scan of case patient 1 at 29 weeks, demonstrating a lower uterine segment length of 9 mm (calipers).

At 26 weeks, cervical length measured 10 mm with some funnelling evident (Figure 2). This resolved by 28 weeks, with a cervical length of 8.5 mm (Figure 3). A classical caesarean section was performed at 34 weeks' gestation, with the delivery of a healthy baby boy weighing 2,380 g. The baby was transferred to the neonatal unit and had an uncomplicated recovery. The patient was discharged home with the baby 2 weeks post-delivery.

The authors are happy to report that she has recently delivered her second child in February 2010.

Case report 3

A 45-year-old nulliparous woman underwent a cone biopsy for cervical intraepithelial neoplasia (CIN 3) prompting a LLETZ procedure, which showed invasive squamous cell carcinoma stage 1b1. Histology showed no lymphovascular spread, and pelvic MRI showed no evidence of parametrial or pelvic lymph node involvement. She underwent a radical vaginal trachelectomy with laparoscopic pelvic lymphadenectomy. The length of cervix removed measured 3.5 cm. The paracervical tissues and vaginal cuff were also removed and an isthmus cerclage was inserted. There were no postoperative complications. The final histology showed CIN 3 with glandular involvement, with no evidence of lymph node involvement.

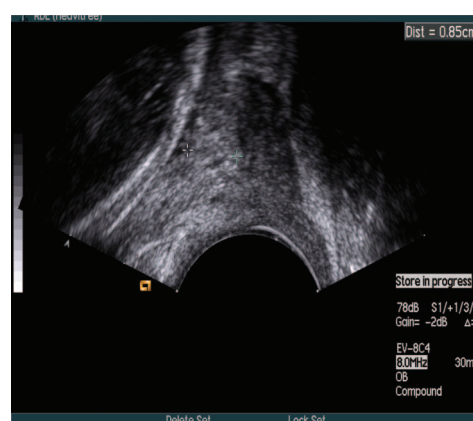


Figure 2. Transvaginal scan of case patient 2 at 26 weeks, demonstrating a lower uterine segment length of 10 mm (calipers) and the presence of funnelling.

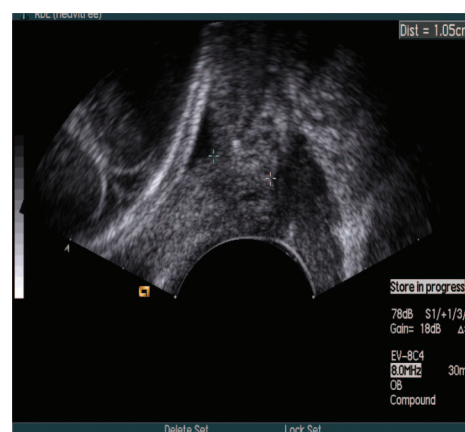


Figure 3. Transvaginal scan of case patient 2 at 28 weeks, demonstrating a lower uterine segment length of 8.5 mm (calipers) without funnelling.

During investigations for secondary infertility, she was noted to have an increased follicle-stimulating hormone level and received ovum donation. Following her third cycle of ovum donation she fell pregnant. Transvaginal ultrasound at 7 weeks demonstrated dichorionic twins. Progesterone 200 mg twice-daily pessaries were commenced. At her 12-week scan, however, one fetus had died. The lower uterine segment was measured regularly. At 24 weeks, this was 34 mm and by 26 weeks, this had reduced to 13 mm with funnelling present (Figure 4).

The patient was admitted for intramuscular betamethasone at 26 weeks and remained as an inpatient throughout her remaining pregnancy. At 36 weeks' gestation, a healthy baby girl weighing 2,720 g was delivered by classical caesarean section. Both mother and baby did well and were discharged home 2 weeks post-delivery.

Case report 4

A 30-year-old woman, parity 1, underwent a loop biopsy after a severely dyskaryotic smear. Histology showed microinvasive squamous cell carcinoma in a background of extensive CIN3. The diameter of spread was approximately 7.5 mm, with a depth of invasion of 2.5 mm, with the nearest margin only 1 mm on the ectocervix. Pelvic MRI showed no residual disease or evidence of lymphatic spread.

She underwent radical vaginal trachelectomy and pelvic lymphadenectomy with preservation of 1 cm of cervix above the tumour excision. Her postoperative cervical smears were normal.

She was otherwise well. Of note, however, was a maternal history of cervical cancer resulting in her mother's death at 39 years. Her previous pregnancy, 18 months prior to the radical vaginal trachelectomy, was uncomplicated, resulting in a normal vaginal delivery of a healthy baby girl, weighing 3,062 kg at 40 weeks' gestation. The patient conceived naturally 2 years following the trachelectomy procedure, but unfortunately miscarried at 10 weeks' gestation. During the evacuation of retained products of conception, the cervical suture was found to be protruding to approximately one-third of its circumference. Although the cerclage was found to be a little loose, it was felt that it

would remain partially effective. A repeat MRI was normal with no evidence of recurrent disease. Colposcopic examination was also negative.

She conceived naturally 5 months later. A transvaginal scan at 10 weeks' gestation confirmed a viable intrauterine pregnancy, with approximately 25 mm of cervix present and no evidence of funnelling. At 12 weeks, she was commenced on progesterone 200 mg pessaries twice daily and serial scans were organised. At 21 weeks (Figure 5), cervical length was 23 mm and the anterior-sited placenta reached the internal cervical os, but did not encroach on it. As the cervical length remained stable, it was decided further surgery would be unnecessary at this point. At 23 weeks, cervical length was 24.6 mm (Figure 6) and at 27 weeks, was partially reduced at 23 mm with no funnelling visible. At 29 weeks, her cervix was found to have shortened to 6 mm. At 30 weeks and 32 weeks, her cervical measurements were 13 mm and 12 mm, respectively.

At 34 + 4 weeks' gestation, a healthy male infant weighing 2,600 g was delivered by classical caesarean section. Both mother and baby recovered well and were discharged back to their local hospital on day 3 post-delivery.



Figure 5. Transvaginal scan of case patient 4 at 21 weeks, demonstrating a lower uterine segment length of 23 mm (calipers) and a low-lying placenta.



Figure 4. Transvaginal scan of case patient 3 at 26 weeks, demonstrating a lower uterine segment length of 13 mm (calipers) with funnelling.

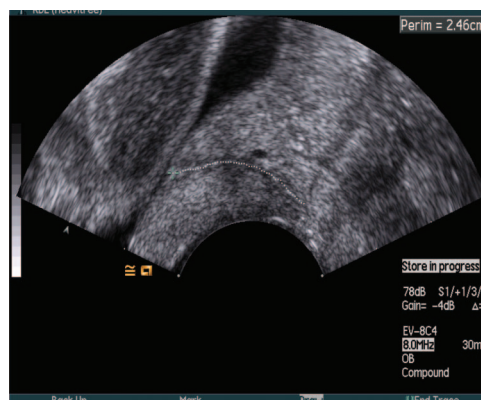


Figure 6. Transvaginal scan of case patient 4 at 23 weeks, demonstrating a lower uterine segment length of 24.6 mm (calipers).

Discussion

Obstetric management of the post-radical vaginal trachelectomy patient during subsequent pregnancy offers several challenges to the obstetrician and management is usually empirical rather than evidence-based. A recent European literature review by Plante (2008), of 256 pregnancies, indicates that 62% of pregnancies following vaginal radical trachelectomy will reach the 3rd trimester, of which 65% will reach term.

Fertility

Patients undergoing radical trachelectomy have reported difficulties in conception (Shepherd et al. 2001; Bernardini et al. 2003). This has been attributed in part, to the lack of cervical mucus or isthmic stenosis (Shepherd et al. 2001). In the second case of our cases, the patient underwent gentle dilation of the cervix following complaints of dysmenorrhoea and dyspareunia postoperatively and conceived that same month. An additional adverse fertility factor is the increasing age in many of these patients. Each patient in this series underwent the procedure between the ages of 30 and 45, which may have contributed to their conception difficulties.

Premature labour and pre-term premature rupture of membranes

Premature labour is perhaps the most important complication of post-radical trachelectomy (Shepherd et al. 2006). A recent review from the USA (Jolley and Wing 2008) shows that in 200 pregnancies post-radical trachelectomy, the rate of pre-term delivery (24–37 weeks) was 25%. In Plante's literature review (Plante 2008), the pre-term delivery was similar at 28%, with 12% ending in significant prematurity (<32 weeks). This is a four-fold increased risk compared with the normal population in England and Wales (NHS 2005). Premature delivery commonly appears to arise following pre-term premature rupture of membranes (PROM) (Shepherd et al. 2001; Bernardini et al. 2003; Ishioka et al. 2007), the mechanism of which is likely to be either due to cervical incompetence or due to ascending infection.

Research shows that even a small decrease in cervical length between the 24th and 28th week of gestation is associated with an increased risk of pre-term birth (Fonseca 2007). Decreased mechanical support for the fetus from the now-absent cervix is a significant risk to pre-term labour. Cerclage put in place at the time of the radical trachelectomy provides a strong support. However, despite this, the extremely shortened cervix still provides a reduction in the barrier, with the fetal membranes being vulnerable to infection, resulting in membrane rupture (Roman 2005). The cervix and lower uterine segment are expected to shorten progressively throughout the pregnancy. Therefore, regular measurements of the lower uterine segment, including checking for funnelling, should be a part of routine prenatal care once in the 2nd trimester. Within our unit, transvaginal ultrasound is carried out every 2 weeks from 12 weeks' gestation until delivery. Elsewhere in the literature, in cases of cervical incompetence, some patients would undergo surgical closure of the cervix at 14 weeks' gestation, known as 'Early Total Cervical Occlusion' (ETCO) (Bernardini et al. 2003). This

has yet to have proven efficacy in trachelectomy patients, but may be of use in those with significantly reduced cervical lengths early in pregnancy or recurrent miscarriage post-procedure.

The absence of the protective cervical mucous plug may also permit vaginal infection to ascend and cause chorioamnionitis (Shepherd et al. 2001). Colonisation of the cerclage stitch itself with bacteria has also been suggested as a possible cause of infection, although as monofilament nylon is used and the cerclage is buried beneath the vaginal epithelium, it is unlikely to become its principal source (Shepherd et al. 2001). In Plante's review, the rate of 2nd-trimester miscarriage is around twice the rate of the general population (8.6% vs 4%), most of which were due to infection and PPRM (Plante 2008). Shepherd et al. (2001) and Shepherd and Milliken (2008) recommended the routine use of prophylactic antibiotics at vulnerable times (16 and 24 weeks) to eradicate the vaginal flora. The same authors recommended bimonthly screening from 16 weeks onwards to be treated promptly with antibiotics if needed (Shepherd et al. 2001). Others have reported the use of daily vaginal povidone-iodine and insertion of an ulinastatin (granulocyte elastase inhibitor) vaginal pessary to prevent infection (Ishioka 2007). We do not routinely give prophylactic antibiotics within our unit, preferring instead to treat proven cases of infection. In the cases we have managed to date, there has been no incidence of chorioamnionitis.

Other risk factors associated with pre-term labour are also applicable in this group, such as breech presentation and cord prolapse (also associated with an incompetent cervix), although their incidence within this population has yet to be determined.

Progesterone supplementation

Vaginal progesterone supplementation has been shown in the literature to reduce the frequency of uterine contractions and thereby reduce the risk of pre-term labour, in high-risk mothers (da Fonseca et al. 2003; da Fonseca 2007; DeFranco et al. 2007). The definition of high risk has traditionally been mothers who have had previous preterm deliveries. There is a shortage of data in the literature supporting the use of progesterone in those with shortened cervical length. da Fonseca et al. (2003) showed that in women with a shortened cervix (<15 mm), the rate of spontaneous delivery before 34 weeks' gestation was lower in those treated with progesterone pessaries (200 mg once daily) than in their placebo group. In our unit, we have prescribed natural progesterone pessaries from 12 weeks' gestation for these women in order to reduce the onset of premature uterine contractions.

Steroid administration

In our unit we administer intramuscular corticosteroids when preterm labour is threatened rather than prophylactically at, e.g. 26 weeks. Steroids appear most effective in preventing respiratory distress syndrome if infants are born >24 h or <7 days from the administration of the first dose (Roberts and Dalziel 2006). We believe that giving prophylactic steroids risks giving the steroids too soon, particularly when there is increasing evidence of potentially harmful effects of repeated doses of steroids (Murphy et al. 2008).

Bed rest and thromboprophylaxis

There is no strong evidence in the literature to support complete bed rest for patients post-trachelectomy. In cases where patients have had bleeding, abdominal pain or signs of cervical shortening, reduction in physical activity, bed rest and regular measurements of cervical length would be pertinent in order to avoid potential miscarriage or pre-term labour (Jolley and Wing 2008; Ishioka et al. 2007). In the second case of our series, bed rest was initiated from 18 weeks' gestation due to persistent episodes of vaginal bleeding, a shortened lower uterine segment (5–6 mm) and her home being greater than a 30-min drive from the hospital. Appropriate thromboprophylaxis is very important due to the increased risk of a thromboembolic event in the sedentary and pregnant population and she was given daily low molecular weight heparin and mechanical stockings.

Classical caesarean section

Onset of uterine contractions in patients post-radical trachelectomy could lead to serious risk of uterine rupture and haemorrhage (Kay et al. 2006). The lower segment is often largely absent and the anatomy distorted due to amputation of the cervix. Transverse incision following radical trachelectomy also risks damage to the uterine arteries and large postpartum haemorrhage (Shepherd et al. 2006). In the cases described, the first case was delivered by classical caesarean at 33 + 3 due to PROM, the second and third case electively at 34 and 36 weeks, respectively. However, we recognise that classical caesarean sections have a higher incidence of intraoperative bleeding compared with lower segment caesarean sections. The increased risk of uterine rupture compared with lower segment caesarean sections in future pregnancies is not applicable in the current context, as planned vaginal delivery is not an option.

Recommendations for obstetric management of mothers post-radical vaginal trachelectomy

- (1) Early referral to consultant care (high-risk obstetrician and gynaecology oncologist) and high risk pregnancy unit
- (2) Vaginal progesterone pessaries from 12 weeks' gestation (200 mg b.d.)
- (3) 2-weekly measurements from 12 weeks' gestation of the lower uterine segment – to assess thickness and funnelling
- (4) Consider regular high vaginal swabs and/or prophylactic antibiotics at 16 and 24 weeks' gestation
- (5) Steroids from 26 weeks' gestation onwards *if* labour threatened
- (6) Offer early admission and bed rest from 24 weeks if labour threatened
- (7) Early booking of classical caesarean section around 34 weeks.

Conclusion and future developments

Increasing experience in both the technique and follow-up of radical vaginal trachelectomy as a fertility preserving management option in early stage cervical cancer has led to evolution of the technique. In the most recent case

described in this report, a modified trachelectomy procedure was performed in which the cervical tumour was excised with a 1 cm margin above the tumour, allowing preservation of some cervical tissue. New techniques such as sentinel node biopsy may reduce the morbidity of treatment (Rob et al. 2008), consequently resulting in a more successful obstetric outcome for those eligible women.

Trachelectomy appears to be an appropriate management strategy for a select group of women with cervical cancer who wish to preserve their fertility, with recurrence risks of around 3% in published series. Cumulative pregnancy rates of between 50% and 70% of patients trying to conceive have been reported (Acheson 2008; Shepherd and Milliken 2008). We propose the above recommendations for the obstetric management of mothers' post-radical vaginal trachelectomy. This set of recommendations is based on current evidence to date in managing the increased risk of prematurity and premature rupture of membranes in these women. In addition, it outlines good clinical care while these women are inpatients, and ultimately the delivery choice of classical caesarean section, either at the onset of contractions, or around 34–36 weeks.

Further data are required regarding the efficacy of progesterone supplementation, assessment of cervical length, benefits of bed rest, routine high vaginal swabs or prophylactic antibiotics, in order to put in place a standardised protocol for optimal and successful obstetric management.

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

References

- Acheson N. 2008. Cervical and endometrial cancer in relation to pregnancy. In: Kehoe S, Jauniaux E, Martin-Hirsch P, Savage P, editors. *Cancer and reproductive health*. London: RCOG Press. pp 133–144.
- Bernardini M, Barrett J, Seaward G, Covens A. 2003. Pregnancy outcomes in patients after radical trachelectomy. *American Journal of Obstetrics and Gynecology* 189:1378–1382.
- Cancer Research UK. 2006. Cancer Research UK Mortality Statistics 2006. Available at: <http://info.cancerresearchuk.org/cancerstats/types/cervix/mortality>
- D'Argent D, Brun JL, Roy M, Remi I. 1994. Pregnancies following radical trachelectomy for invasive cervical cancer. *Gynecologic Oncology* 52:105.
- DeFranco EA, O'Brien JM, Adair CD, Lewis DF, Hall DR, Fusey S et al. 2007. Vaginal progesterone is associated with a decrease in risk for early preterm birth and improved neonatal outcome in women with a short cervix: a secondary analysis from a randomized, double-blind, placebo-controlled trial. *Ultrasound in Obstetrics and Gynaecology* 30:697–705.
- Farthing A. 2006. Conserving fertility in the management of gynaecological cancers. *British Journal of Obstetrics and Gynaecology* 113:129–134.
- da Fonseca EB, Bittar RE, Carvalho MH, Zugaib M. 2003. Prophylactic administration of progesterone by vaginal suppository to reduce the incidence of spontaneous preterm birth in women at increased risk: a randomized placebo-controlled double-blind study. *American Journal of Obstetrics and Gynecology* 188:419–424.
- da Fonseca EB, Celik E, Parra M, Singh M, Nicolaides KH; Fetal Medicine Foundation Second Trimester Screening Group. 2007. Progesterone and the risk of preterm birth in women with a short cervix. *New England Journal of Medicine* 357:462–469.

- Ishioka S, Endo T, Hayashi T, Baba T, Umemura K, Saito T. 2007. Pregnancy-related complications after vaginal radical trachelectomy for early-stage invasive uterine cervical cancer. *International Journal of Clinical Oncology* 12: 350.
- Jolley JA, Wing, D. 2008. Pregnancy management after cervical surgery. *Current Opinion in Obstetrics and Gynaecology* 20: 528–533.
- Kay TA, Renninson JN, Shepherd JH, Taylor MJ. 2006. Successful pregnancy following radical trachelectomy and in vitro fertilisation with ovum donation. *British Journal of Obstetrics and Gynaecology* 113:965–966.
- Murphy KE, Hannah ME, Willan AR, Hewson SA, Ohlsson A, Kelly EN et al. 2008. Multiple courses of antenatal corticosteroids for preterm birth (MACS): a randomised controlled trial. *Lancet* 372:2143–2151.
- NHS. 2005. NHS Maternity Statistics 2004/5. Available at: www.hsj.co.uk/news/nhs_maternity_statistics_england_20045.html
- Plante M. 2008. Vaginal radical trachelectomy: an update. *Gynecologic Oncology* 111:S105–S110.
- Rob L, Pluta M, Strnad P, Hrehorcak M, Chmel R, Skapa P et al. 2008. A less radical approach to the fertility-sparing trachelectomy in patients with stage I cervical cancer. *Gynecologic Oncology* 111:S116–S120.
- Roberts D, Dalziel SR. 2006. Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth. *Cochrane Database of Systematic Reviews* 3:CD004454.
- Roman LD. 2005. Pregnancy after radical trachelectomy: maybe not such a risky undertaking after all. *Gynecologic Oncology* 98:1–2.
- Shepherd JH, Milliken DA. 2008. Conservative surgery for carcinoma of the cervix. *Clinical Oncology* 20:395–400.
- Shepherd JH, Mould T, Oram DH. 2001. Radical trachelectomy in early stage carcinoma of the cervix: outcome as judged by recurrence and fertility rates. *British Journal of Obstetrics and Gynaecology* 108:882–885.
- Shepherd JH, Spencer C, Herod J, Ind TE. 2006. Radical vaginal trachelectomy as a fertility-sparing procedure in women with early-stage cervical cancer-cumulative pregnancy rate in a series of 123 women. *British Journal of Obstetrics and Gynaecology* 113:719–724.