



# STIs in pregnancy

## An update for GPs

**Catriona Ooi**, MBBS, BSc (Med), FACSH, is a sexual health physician, Clinic 16, Royal North Shore Hospital and Manly Sexual Health, New South Wales.

**Linda Dayan**, BMedSc, MBBS, DipRACOG, MM (VenSci), FACSH, MRCMA, is Director, Sexual Health Services, Northern Sydney Health, New South Wales.



### BACKGROUND

Pregnancy and sexually transmitted infections (STIs) are both consequences of unprotected vaginal sex. In addition to causing maternal morbidity in their own right, many STIs including human immunodeficiency virus (HIV) can be transmitted to the neonate. Antenatal screening during pregnancy provides an opportunity to minimise or eliminate the antepartum, intrapartum and postpartum consequences of most STIs.

### OBJECTIVE

This article discusses the diagnosis, management and treatments available for STIs in pregnancy to minimise morbidity and mortality for both mother and child.

### DISCUSSION

HIV testing in antenatal care should be added to routine syphilis and hepatitis B serology, as effective HIV interventions can significantly reduce the risk of mother-child transmission. Consideration should be given to testing in women less than 25 years of age for chlamydia and those women at increased sexual risk. Male partners should not be forgotten and contact tracing, treatment and follow up offered. Due to the very small risk associated with genital warts and genital herpes, normalisation, information and reassurance are appropriate for the majority of women affected.

Approximately 50% of pregnant Australian women are involved in antenatal shared care programs.<sup>1</sup> General practitioners are actively involved in maternal and fetal health, either as primary obstetricians or through shared care.

As a consequence of unprotected sexual activity, pregnant women are at risk of sexually transmitted infections (STIs) and human immunodeficiency virus (HIV). With the decreasing age of female coitarche extending a woman's fertile lifespan and the increasing incidence of most STIs, infection in pregnancy is affecting more women. The implications of these infections are significant for both mother and child. Ranging from ectopic pregnancy, spontaneous abortion and stillbirth to perinatal infections and congenital abnormalities, the outcomes may depend upon identification and correct and prompt management.<sup>2</sup>

While testing for hepatitis B and syphilis in pregnancy is performed routinely as part of an 'antenatal blood screen', other STIs are often inadequately addressed and overlooked by both obstetricians and primary care physicians involved in shared antenatal care. Infections to consider are listed in *Table 1*.

A survey of American obstetricians found that although most tested for gonorrhoea and chlamydia, less than 10% used standard of care tests.<sup>3</sup> A British survey of GPs

revealed that: of women referred for termination of pregnancy, only 3% were tested for STIs; only 1% of doctors routinely tested this population for STIs; and 81% never tested for STIs.<sup>4</sup> Despite Royal Australian and New Zealand College of Obstetrics and Gynaecology (RANZOG) recommendations to offer HIV screening to all pregnant women, one study found only 51% of obstetricians always screen for HIV.<sup>5</sup> In the same study, only 20% of obstetricians asked questions to assess the risk of exposure to blood borne viruses.

### Antenatal screening recommendations

Screening for all asymptomatic STIs in pregnancy is not done routinely. While New South Wales Health Department guidelines for screening STIs and blood borne viruses in pregnancy advocate routine testing for hepatitis B, HIV and syphilis, and screening for chlamydia, gonorrhoea and hepatitis C based on risk assessment,<sup>6</sup> The Royal Australian College of General Practitioners (RACGP) 'Guidelines for preventive activities in general practice' does not mention STIs in antenatal care.<sup>7</sup> The RANZOG guidelines for antenatal screening recommend routine screening for syphilis and hepatitis B, and that all women be offered screening for HIV.<sup>8</sup> An Australian

Table 1. Infections to consider

**Genital warts**

Genital warts are the clinical manifestation of human papilloma virus (HPV), which infects up to 75% of the sexually active population. In contrast only 1% will have visible clinical lesions.<sup>15</sup> The relative state of immunosuppression in pregnancy may result in the inability of the host immune system to suppress already present, latent virus.<sup>16</sup> Genital warts can proliferate during pregnancy, and some specialists advocate treatment. However, risks are low and information and reassurance is appropriate for the majority of women affected. In many cases, clinically obvious lesions regress after delivery. The benefit of caesarean section for prevention of HPV transmission is not known, however, this may be indicated in rare cases where bulky warts obstruct the pelvic outlet. There is no known association of HPV with pregnancy complications including miscarriage or premature labour. If therapy is undertaken during pregnancy, cryotherapy is a safe, simple, cheap and effective method of treatment. Imiquimod, podophyllin and podophyllotoxin should not be used in pregnancy.

**Genital herpes**

Neonatal herpes is rare in Australia with rates of 3.2 cases in 100 000 live births.<sup>17</sup> Up to 80% of cases are due to HSV-2 with 85% of transmissions due to perinatal exposure via the birth canal. Approximately 5% of infections are due to intrauterine exposure, usually from ascending lower genital tract infection, and up to 10% of transmissions occur postnatally via family members and staff.<sup>18</sup> Risk of neonatal herpes is very low for women with recurrent genital herpes, estimated at less than 1%.<sup>19</sup> The highest risk of vertical transmission is when the mother has not completed seroconversion by labour (ie. a primary infection) and therefore does not possess antibodies to protect her child.<sup>20</sup> There is a 50% risk of neonatal herpes if a primary infection is acquired in the third trimester and a 20% risk for a primary HSV-2 infection with previous HSV-1 infection. Other factors that may influence rates of vertical transmission include invasive procedures, prolonged rupture of membranes, and caesarean section.<sup>18</sup> Antiviral medication is not routinely required in pregnancy. While none of the antiviral agents are licensed for any indication in

pregnancy, aciclovir has been the most widely used with the most data available, with no apparent increase in congenital abnormalities. Suppressive treatment with acyclovir in the third trimester has been shown to reduce viral shedding and recurrences at delivery, and reduce the rate of caesarean section.<sup>21</sup> Treatment may be appropriate where clinically indicated and for primary and first episodes in the third trimester. While suppressive therapy is not recommended for recurrent genital herpes, women should be encouraged to discuss their options with their treating obstetrician.

**HIV**

Studies in HIV positive women have shown that pregnancy does not increase maternal mortality or progression of infection. There is no increase in antenatal mortality or fetal malformations in those women with asymptomatic HIV infection, and only a small increase in rates of spontaneous abortion, and a possible increased risk of low birth weight and premature delivery.<sup>22</sup> Transmission occurring in the antepartum period via transplacental spread is uncommon, and the majority of risks for transmission occur via direct contact during delivery and postpartum via breastfeeding. Factors influencing transmission include stage of maternal infection and maternal health status including viral load, CD4 count, prolonged rupture of membranes, availability and use of antiretroviral treatments, other coexisting infections, mode of delivery, and mixed or exclusive breastfeeding. Vertical transmission rates range from 10–40%, but can be reduced to less than 2% with antiretroviral treatment and optimal antenatal and postnatal care.<sup>23</sup> Women should be co-managed by an experienced HIV physician and an obstetric unit. For new diagnoses, referral and advice in delivering the HIV positive result will minimise the difficult emotional issues, including those of contact tracing that will inevitably occur.

**Hepatitis B**

Hepatitis B screening is universal for all pregnant women in Australia. Nationwide, the highest rates of newly acquired infections occur in the 20–29 years of age group.<sup>12</sup> With acute infection, neonatal risk is dependant upon gestational age at infection, with transmission risk of 80–90% in third trimester

survey of local hospital protocols and national guidelines for antenatal care in obstetrics and general practice found inconsistencies in screening and recommendations from hospital to hospital, area to area.<sup>9</sup>

Screening programs are cost effective for women with planned and unplanned pregnancies, either seeking termination or continuing to term.<sup>10</sup>

**Epidemiology**

The risk of STI acquisition in pregnancy may vary according to patient characteristics and

between specific infections. *Neisseria gonorrhoea* and *Chlamydia trachomatis* for example, are associated with young age, high frequency of partner change, lack of barrier contraception, low socioeconomic group and smoking.<sup>11</sup>

In Australia, surveillance data has revealed a steady increase in chlamydial infections across all states and territories with rates greater than 650/100 000 in the Northern Territory. Nationwide, the 15–29 years age group had the highest rate of infection with 400–500 cases/100 000 in 2002. From 1998 to 2002, gonorrhoea rates have remained rel-

atively steady nationwide. The highest rates are found in the Northern Territory with up to 700/100 000 in 2002, followed by Western Australia with 70/100 000 cases. Again the highest rates were found in the 15–29 years age group; overall about 80/100 000.<sup>12</sup>

Between 1998 and 2002, 8% of newly acquired HIV infections were via heterosexual spread.<sup>12</sup> Data from HIV infected women who have had children show the biggest risk was from high prevalence countries. While HIV infection remains relatively uncommon in Australia, the consequences of undiagnosed

infection compared to 10% if infection occurs in the first trimester. In chronic HBV infection, neonatal risk is dependant on infectivity of the mother, significantly higher where the mother is HBs antigen positive, HBe antigen positive; compared to women HBe antigen negative. Overall in chronic infection, up to 95% of perinatal transmission occurs intrapartum via direct exposure. Hepatitis B passive and active immunisations are safe in pregnancy. High risk women can be vaccinated in pregnancy and immunoglobulin is recommended for the neonate.

### Chlamydia

Most infections with chlamydia are asymptomatic, and rates in Australia are highest in the 15–29 years age group; corresponding with the age group most likely to become pregnant. Chlamydial infection may affect the pregnancy, mother, child, and a woman's potential ability for future pregnancies. Ascending infection with chlamydia in nonpregnant women may result in tubal compromise, ectopic pregnancy and infertility. Untreated antenatal chlamydia may result in postpartum infection, and endometritis and postabortal PID in women seeking termination. In some studies, antenatal chlamydial infection has been associated with prematurity, preterm delivery and low birth weight. In pregnancy, transplacental transfer of maternal chlamydial IgG is not protective for the fetus, with nearly two-thirds of neonates directly exposed to chlamydia becoming infected. Up to 50% of neonates born to infected mothers will develop the most significant clinical manifestation of neonatal infection – infectious conjunctivitis. More than half of these infants will have concurrent nasopharyngeal infection. Of those with a nasopharyngeal infection, approximately 30% will develop chlamydial pneumonia. Widespread availability of noninvasive urine nucleic acid PCR/LCR testing for chlamydia has improved the ease and sensitivity of chlamydia tests, which should be offered to all young women and those at risk (eg. new sexual partner).

### Gonorrhoea

Although uncommon in urban Australia, identification and treatment is essential to protect mother, child and future reproductive health. Similar to chlamydia, untreated gonorrhoea may affect tubal patency and fertility in the nonpregnant female,

and lead to postnatal and postabortal upper genital tract infection in pregnant women. Gonorrhoea in pregnancy is associated with higher rates of prematurity, premature rupture of membranes, and low birth weight. Infection of the neonate usually occurs in the peripartum period via direct exposure. Without prophylaxis, up to nearly 50% of exposed infants will develop gonococcal ophthalmia neonatorum, the risk increasing with prolonged rupture of membranes. Gonococcal sepsis of the neonate may occur but is rare.

### Syphilis

Syphilis is a sexually transmitted treponemal infection with serious sequelae in pregnancy. Although experiencing resurgence in homosexually active men in western countries, rates in the heterosexual population in Australia have remained stable; traditionally reported within indigenous communities in rural areas. Syphilis testing in antenatal care is one of a few standardised tests for pregnant women in Australia and as a result there are low rates of syphilis related sequelae within populations with good access to health services. Pregnancy outcome depends upon the stage of maternal infection. Untreated early syphilis will affect almost all fetuses. Premature delivery or perinatal death will occur in 50% of all maternal primary or secondary infections, 40% of those with early latent infection. Untreated late syphilis will result in congenital syphilis in 10% of infants, with the perinatal death rate increasing by 10%. Treatment with penicillin remains the gold standard in pregnancy with documented efficacy. For women with penicillin allergies, desensitisation is advised. There is current research into treatment in pregnancy with azithromycin. Jarisch-Herxheimer reactions – an acute febrile illness occurring 24 hours after treatment – is most common in early syphilis and may induce early labour and cause fetal distress in pregnancy; inpatient treatment may be advised. False positive results on nontreponemal syphilis screening tests such as the venereal disease reference laboratory (VDRL) and the rapid plasma reagin (RPR) may occur during pregnancy and confirmation should be offered with specific treponemal antibody tests.

infection are serious and the infection, usually asymptomatic.

## Special considerations for the pregnant woman

### Effects of pregnancy on infection

Pregnancy may modify the manifestations of many STIs, posing diagnostic dilemmas and complications for management.

Suppressed maternal immunocompetence may alter the host response to infection, and alter the natural history of many STIs. Genital warts tend to become more

florid during pregnancy, and may resolve spontaneously in the postnatal period. Host response and susceptibility may alter due to the vaginal flora changes during pregnancy, a consequence of an increase in vaginal pH and change of lower genital tract vascularity.

The anatomical changes of pregnancy may both protect and increase the susceptibility of the mother to ascending infection. Hormone changes cause cervical hypertrophy resulting in a larger area of columnar epithelium potentially exposed to micro-organisms, a situation similarly seen in oral contraceptive

pill users with an associated higher incidence of STIs. Thick cervical secretions create a 'mucus plug' which is believed to act as a barrier preventing ascending micro-organisms entering the uterine cavity. The development of the chorioamnion in the growing uterus obliterates the uterine cavity 'space' after the first trimester thereby resulting in a decreased risk of salpingitis. Conversely, the risk of chorioamnionitis is increased, particularly after week 16; its usual position overlying the cervical os perhaps contributing to this.

Less commonly, intrauterine infection

may result from haematogenous spread. Manifestations of infection depend largely upon the gestational age at infection. Syphilis, HIV, and rarely herpes, have all been associated with postnatal infection, congenital disease, premature birth, stillbirth and abortion.

### Future fertility

Sexually transmitted infections in the non-pregnant woman may affect future fertility. Infections such as gonorrhoea and chlamydia may ascend from the cervix or vagina to cause pelvic inflammatory disease (PID) – an infection of the upper genital tract. Consequences of this syndrome include tubal scarring, ectopic pregnancy and infertility. With each episode of PID, the risks of tubal damage and infertility are increased 4-6-fold.<sup>13</sup>

### Operative procedures including termination of pregnancy

Iatrogenic PID may result from the direct introduction of organisms into the uterine cavity. This may occur during intrauterine device insertion, dilatation and curettage and suction procedures for termination of pregnancy (TOP). Bacterial vaginosis at the time of a TOP can increase the risk of PID.<sup>14</sup> Screening for chlamydia infection before referral, and treating before operative TOP is ideal, with screening based on risk factors including age less than 25 years and sexual practices and behaviour such as a recent change in sexual partner. Sexual partners must be contacted and treated.

### Contact tracing and support

All partners of women diagnosed with STIs should be contacted, screened and treated. Similarly, all mothers (and their partners) of neonates exhibiting signs of STI exposure should undergo testing and epidemiological treatment. Referral to a sexual health service should be considered. Emotional support, issues in regard to testing sexual partners, and providing emotional support and education should be done with sensitivity and care. Partners and their women should be seen separately in order to ensure due considera-

tion is given to confidentiality issues.

### Conclusion

Unprotected sexual activity may result in both pregnancy and transmission of STIs. Consequences of asymptomatic STIs including HIV can have serious associated morbidity and mortality to both mother and child. With excellent interventions and minimally invasive tests, screening for both HIV and chlamydia in young women should be added as part of routine screening with informed consent and pretest discussion (see *Patient education* page 727 this issue). Pretest discussion includes assessing risk of infection and thus a brief sexual history should be added to the obstetric and gynaecological history.

Conflict of interest: none declared.

### References

- Gunn J. Shared antenatal care: where has it been and where is it heading? *Aust Fam Physician* 2003;32:100-101.
- Donders GG, Desmyter J, De Wet DH, Van Assche FA. The association of gonorrhoea and syphilis with premature birth and low birth-weight. *Genitourinary Med* 1993;69:98-101.
- Weisbord JS, Koumans EH, Toomey KE, Grayson C, Markowitz LE. Sexually transmitted diseases during pregnancy: screening, diagnostic and treatment practices among prenatal care providers in Georgia. *South Med J* 2001;47-53.
- Harper RL, Maguire HC, Kurtz Z. STD and HIV screening in general practice: a survey related to termination of pregnancy in south Thames. *Br J Gen Pract* 1998;1083-1084.
- Giles ML, Sasadeusz JJ, Garland SM, Grover SR, Hellard ME. An audit of Obstetricians' management of women potentially infected with blood borne viruses. *Med J Aust* 2004;180:328-332.
- Screening for sexually transmissible diseases (STDs) and blood borne viruses (BBV) in pregnancy. Circular no 20000/63. NSW Health Department, July 2000.
- The Royal Australian College of General Practitioners. National Preventive and Community Medicine Committee. Guidelines for preventive activities in general practice. 5th edn. *Aust Fam Physician* 2002;31:SI1-SI61.
- The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Statement no. C-Obs 3: Antenatal screening tests. July 2003.
- Hunt JM, Lumley J. Are recommendations about routine antenatal care in Australia consistent and evidence based? *Aust J Med* 2002;176:255-259.
- Blackwell AL, Thomas PD, Wareham K, Emery

- Health gains from screening for infection of the lower genital tract in women attending for termination of pregnancy. *Lancet* 1993;342:206-210.
- Schofield MJ, Minichiello V, Mishra GD, Plummer D, Savage J. Sexually transmitted infections and use of sexual health services among young women: Women's health Australian study. *Int J STD/AIDS* 2000;11:313-323.
- National Centre HIV Epidemiology and Clinical Research. National Surveillance Data 2003. Available at: [www.med.unsw.edu.au/nchecr/](http://www.med.unsw.edu.au/nchecr/).
- Hillis SD, Owens LM, Marchbanks PA, Amsterdam LF, MacKenzie WR. Recurrent chlamydial infections increase the hospitalisation for ectopic pregnancy and pelvic inflammatory disease. *Am J Obstet Gynecol* 1997;176:103-107.
- Larson PG, Platz Christensen JJ, Thejls H, Forsum U, Pahlson C. Incidence of pelvic inflammatory disease after first trimester legal abortion in women with bacterial vaginosis after treatment with metronidazole: a double blind, randomised study. *Am J Obstet Gynaecol* 1992;66:100-103.
- Koutsky LA. Epidemiology of genital papillomavirus infection. *Am J Med* 1997;102:3-8.
- Peng TC, Searle CPH, Shah KV, Repke JT, Johnson TRB. Prevalence of human papillomavirus in term pregnancy. *Am J Perinatol* 1990;7:189-192.
- Morris A, Ridley GF, Elliot EJ. Australian paediatric surveillance unit: progress report. *J Paediatr Child Health* 2002;38:8-15.
- International Herpes Management Forum. Strategies for interrupting the transmission of genital HSV infection. Corey L, ed. March 2003.
- Brown ZA, Benedetti J, Selke S, Ashley R, Watts DH, Corey L. Asymptomatic maternal shedding of herpes simplex virus at the onset of labour: relationship to preterm labour. *Obstet Gynaecol* 1996;87:483-488.
- Brown ZA, Selke S, Zeh J, et al. The acquisition of herpes simplex virus during pregnancy. *N Engl J Med* 1997;337:509-515.
- Sheffield JS, Hollier LM, Hill JB, Stuart GS, Wendel GD. Acyclovir prophylaxis to prevent HSV recurrence at delivery: a systematic review. *Obstet Gynaecol* 2003;102:1396-1403.
- Lambert JS, Watts DH, Mofenson L, et al. Risk factors for preterm birth, low birth weight, and intrauterine growth retardation in infants born to HIV infected pregnant women receiving zidovudine. *Paediatric AIDS Clinical Trials Group 185 Team. AIDS* 2000;14:1389-1399.
- Mofenson LH. Advances in the prevention of vertical transmission of human immunodeficiency virus. *Sem Paed Infect Dis* 2003;14:295-308.



**Correspondence**  
Email: [cooi@doh.health.nsw.gov.au](mailto:cooi@doh.health.nsw.gov.au)