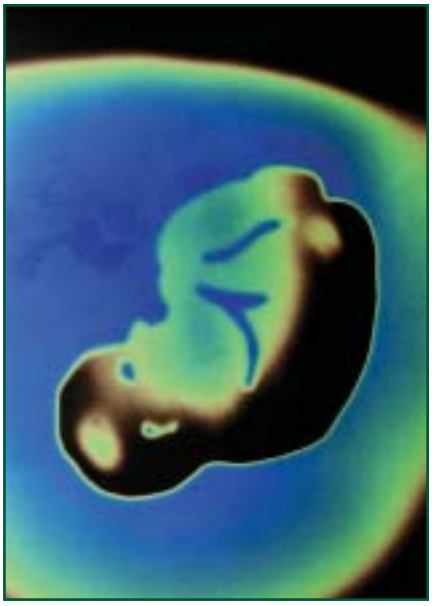

Varicella Zoster And Bacterial Vaginosis In Pregnancy

Both varicella zoster and bacterial vaginosis can be problematic for the pregnant woman and her fetus. Primary-care physicians must be able to recognize these infections so treatment strategies can be carried out.

By Catherine C. Code, MD; and Alan J. Karovitch, MD, MEd, FRCPC

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Although quite different from each other, both varicella zoster and bacterial vaginosis are common infections, which affect many pregnant women. Both of these infections can be problematic for a pregnant woman and her fetus. Timely and cost-effective management strategies, therefore, are required for dealing with these infections, particularly in the primary-care setting.

Chicken Pox Exposure in Pregnancy

Varicella zoster is a member of the herpes virus family and is the causative agent in chicken pox and

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Chicken Pox In Pregnancy

shingles. Chicken pox is mainly a childhood disease and usually is self-limited in nature. Two per cent of all chicken pox illnesses occur in those over the age of 20 years. The incidence of chicken pox in pregnancy is 0.5 to 0.7 per 1,000 pregnancies.[1]

Varicella zoster virus is highly infectious. Ninety per cent of exposed individuals without immunity develop clinically evident disease. Transmission occurs through infected secretions from the nasopharyngeal mucosa. It also can be transmitted through direct contact with vesicular fluid and through airborne spread of the virus. The incubation period is 10 to 21 days. The illness begins with a prodrome of fever, malaise and myalgias lasting 24 to 48 hours. A vesicular rash then develops over the trunk, face, scalp and limbs. A new crop of lesions erupt every two to three days, lasting six to 10 days. Individuals are infectious from one to two days prior to the onset of the rash, until all of the lesions have crusted over.

Complications from varicella infection (*i.e.*, bacterial superinfection, pneumonia, ocular disease) are not common, but they may show up in adult patients.

Maternal Risk

Varicella pneumonia occurs in 20% of adult chicken pox cases.[2] Pneumonia usually develops within one week of the rash. Symptoms include cough, shortness of breath, fever and tachypnea. The course is unpredictable and has the potential to

Summary

Varicella Zoster And Bacterial Vaginosis In Pregnancy

- Varicella zoster is a member of the herpes virus family and is the causative agent in chicken pox and shingles. The incidence of chicken pox in pregnancy is 0.5 to 0.7 per 1,000 pregnancies.
- Varicella pneumonia constitutes a medical emergency in pregnant women, with maternal mortality occurring in up to 6% of patients.
- Thirty per cent of infants affected with congenital varicella syndrome die within the first month of life, whereas maternal herpes zoster, during any stage of pregnancy, has not resulted in congenital anomalies.
- Neonatal varicella is a serious illness, with a mortality rate reaching 30%. The illness consists of a fever and a vesicular eruption.
- Most women are immune to varicella. Of all the women who do not know their chicken pox history or who have a negative history, 85% have been shown to be immune.
- Varicella vaccine is now available, but is not administered routinely to nonimmune adults. Pregnant women should not receive vaccination against varicella.
- Increased rates of spontaneous abortions, preterm labor, preterm birth, preterm rupture of membrane, amniotic fluid infection, endometritis and postcesarean section wound infection have all been associated with bacterial vaginosis.
- If screening for bacterial vaginosis is warranted, it should be done prior to 24 weeks gestation because all women will need to be retested later in the pregnancy.
- Screen for bacterial vaginosis only if the patient is symptomatic or if there is a history of preterm birth.

progress to respiratory failure. Retrospective studies suggest varicella pneumonia is more severe, but not more common, in pregnant patients, as compared to the general adult population.[3] Varicella pneumonia constitutes a medical emergency in pregnant women, with maternal mortality occurring in up to 6% of patients.[4] Treatment of varicella pneumonia requires prompt supportive care and antiviral treatment with intravenous acyclovir.[2]

Fetal Risk

The precise mechanism of *in utero* infection is unknown. It has been accepted that maternal viremia leads to placental infection and, subsequently, to fetal infection. The fetus then develops chicken pox and infection of the dorsal root ganglia occurs, leading to cell destruction of nerve tissue. It is the destruction of nerve tissue that may account for the findings seen in congenital varicella syndrome.[5]

The first case of congenital varicella syndrome was reported in 1947.[6] There are now about 100 cases reported. The risk of developing the syndrome is approximately 2% if maternal infection with chicken pox occurs prior to 20 weeks gestation.[1] Exposure beyond 20 weeks gestation does not seem to result in congenital varicella syndrome. Congenital varicella syndrome can lead to skin lesions (76%), neurologic deficits (60%), eye disease (51%) and skeletal anomalies (49%). Thirty per cent of affected infants die within the first month of life.[7] In contrast, maternal herpes zoster, during any stage of pregnancy, has not resulted in congenital anomalies.[8]

Neonatal Risk

Neonatal varicella is a serious illness, with a mortality rate reaching 30%. The illness consists of a fever and a vesicular eruption. In mild cases, the lesions heal within seven to 10 days. In more severe cases, disseminated disease may occur with or without visceral involvement. The neonate is at greatest risk when the mother is exposed to varicella or has clinical manifestations of disease close to the time of delivery. Case rates increase to 20% when symptoms of maternal infection occur within five days prior to delivery or within two days after delivery.[9,10] The administration of varicella immune globulin to the neonate may help to prevent or modify the disease.[10]

Diagnosis. The diagnosis of chicken pox usually is made clinically. Varicella zoster virus can be cultured from vesicular fluid if it is needed to confirm the nature of a rash. Serologic tests are available and can be used to diagnose acute varicella infection or to determine a patient's immunity to chicken pox. Immunoglobulin M (IgM) antibodies, which indicate acute infection, can be detected within as early as three days of the onset of varicella symptoms. Immunoglobulin G (IgG) antibodies can be detected as early as seven days.[10]

Determining whether or not a fetus has developed congenital varicella syndrome while still *in utero* is possible. Fetal ultrasounds can be used to identify limb abnormalities.[11] Fetal blood can be obtained through percutaneous umbilical blood sampling and tested for varicella serology and deoxyribonucleic acid (DNA) testing. Amniotic fluid through amniocentesis can be obtained for similar tests. These methods can

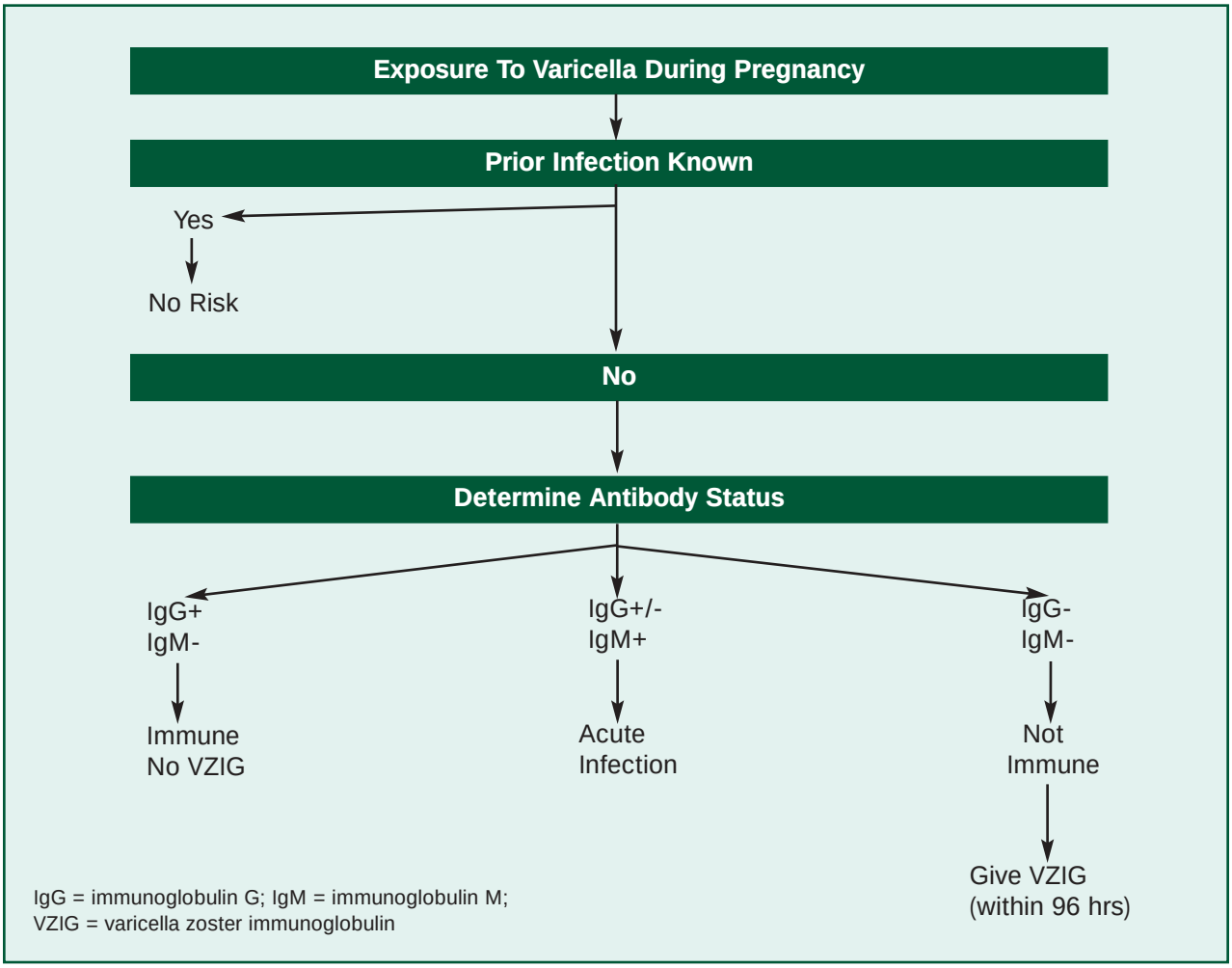

Figure 1. Approach to varicella exposure in pregnancy.

identify varicella zoster virus infection, but cannot predict the sequelae from the infection.[12,13]

Your Patient Has Been Exposed To Varicella

Most women are immune to varicella. Of all the women that do not know their chicken pox history or who have a negative history, 85% have been shown to be immune.[1] When a pregnant woman gives a history of varicella exposure, one should clarify the nature and timing of exposure (Figure 1). If your patient has had varicella previously, then she is immune; there is no risk and she should be reassured. If, however, a history of previous varicella infection is negative or unknown, then varicella serology should be checked.

Different laboratory methods are available for testing varicella serology. The latex agglutination test is rapid and simple to perform, with results available within one hour. Most centers use immunofluorescence and enzyme-linked immunosorbent assay (ELISA) techniques,

Chicken Pox In Pregnancy

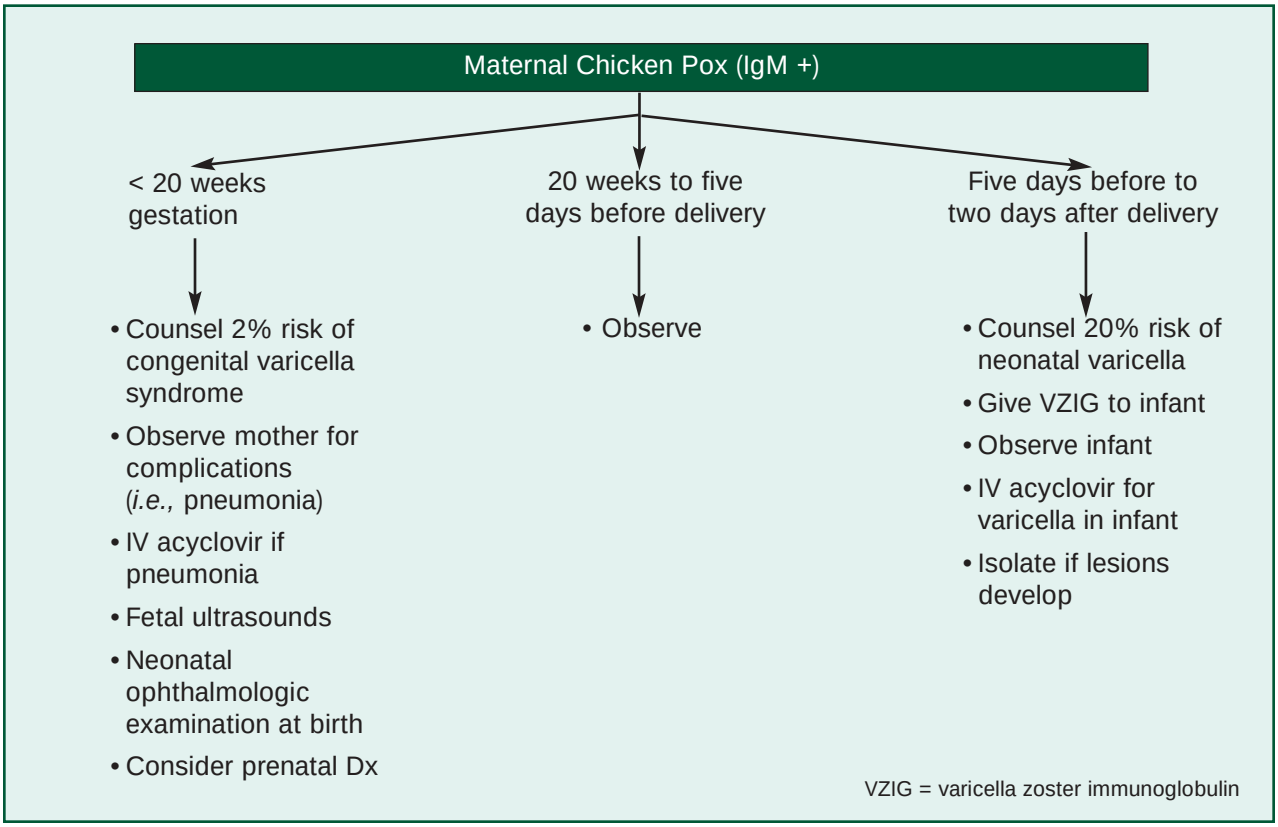

Figure 2. Management of chicken pox in pregnancy.

The risk of developing congenital varicella syndrome is approximately 2% if maternal infection with chicken pox occurs prior to 20 weeks gestation.

which have longer turnaround times. All tests have been found to be comparable.[14] For practical purposes, a turnaround time of less than 96 hours is required.

If varicella IgG is present (and IgM is negative), the patient is considered immune and should be reassured. If the results are seronegative (*i.e.*, IgG and IgM negative), she is not immune and is therefore susceptible. She should be given varicella zoster immunoglobulin (VZIG). Administration of VZIG should ideally be given within 96 hours of exposure, but there still may be benefit up to 10 days.[15] VZIG is used to prevent or reduce the severity of maternal disease. It likely does not change the incidence of congenital varicella syndrome.[8] VZIG costs approximately $625 and is a blood product.

If the patient's serology is IgM positive (and IgG is positive or negative), she has developed acute infection (Figure 2). If she is at less than 20 weeks gestation, there is an approximate 2% risk of her fetus developing congenital varicella embryopathy. The patient also should be observed closely for signs of pneumonia.

Intravenous acyclovir is the standard treatment for varicella pneumonia.[16] A detailed fetal ultrasound should be done at 16 weeks to 20 weeks gestation, or at five weeks after infection — whichever comes first. The ultrasound is used to assess the presence of congenital varicella syndrome. A neonatal ophthalmology examination also should be conducted at birth. Another option in considering prenatal diagnosis is to use fetal blood sampling or amniocentesis.

If maternal chicken pox occurs less than five days prior to delivery, or within two days after delivery, there is a 20% risk of varicella in the neonate with an associated mortality rate of up to 30%. VZIG is indicated for the neonate and should be given to the infant as early as possible after delivery or exposure. If neonatal varicella does develop, treatment should include intravenous acyclovir.[16] Babies of nonimmune mothers exposed postnatally to varicella in the first 28 days after delivery also are at an increased risk of severe illness, as compared with older infants. VZIG, therefore, is recommended for babies up to 28 days old who are seronegative and exposed to varicella.[16]

Breastfeeding should be encouraged for babies infected with, or exposed to, varicella. A mother with chicken pox/herpes zoster does not need to be isolated from her own baby. Mothers

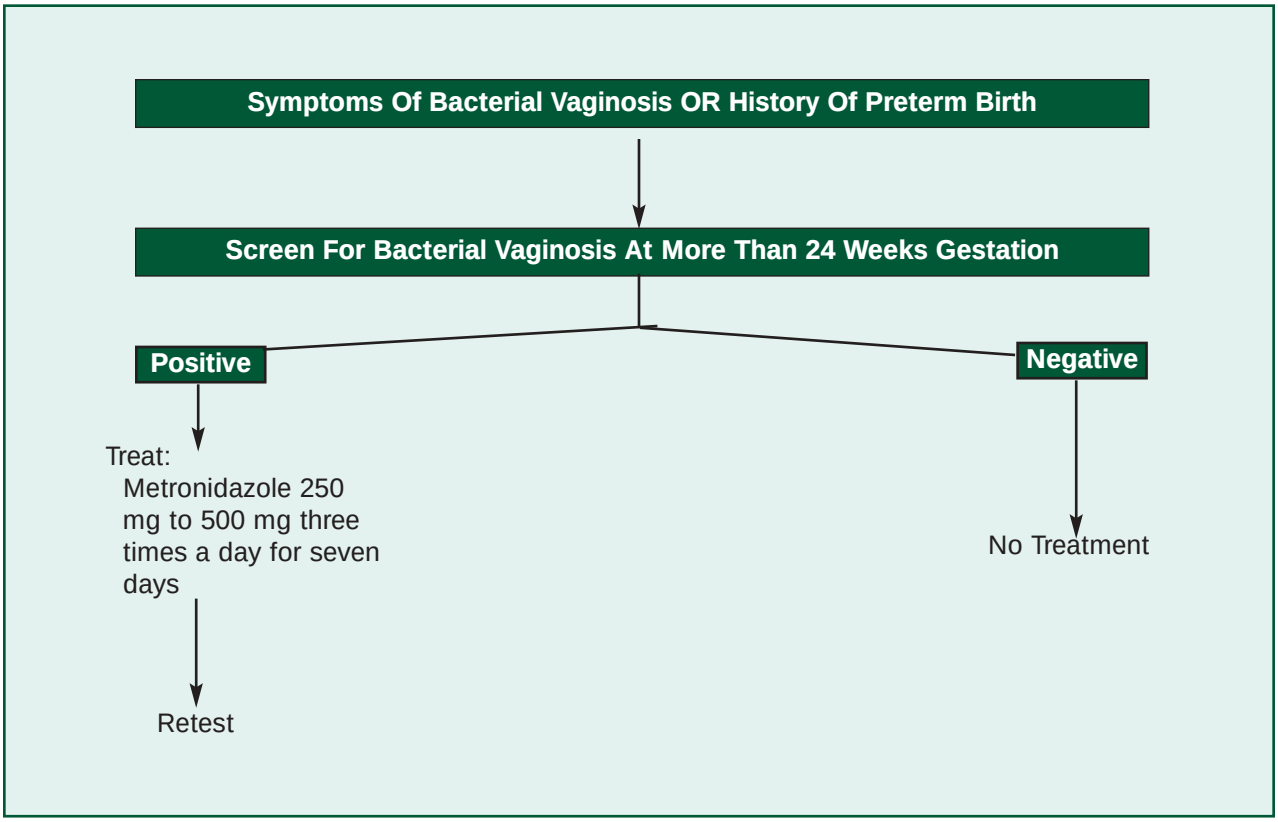

Figure 3. Management of bacterial vaginosis in pregnancy.

with varicella, as well as their neonates, need to be isolated from other nonimmune mothers and neonates.

Era of Vaccination

Varicella vaccine is now available, but is not routinely administered to nonimmune adults. Pregnant women should not receive vaccination against varicella. There is a theoretical risk of inducing congenital disease in the fetus. If women of reproductive potential do not know their immune status, this can be tested prior to conception. Nonpregnant women who receive vaccination should be advised to avoid pregnancy for at least one month. The seroconversion rate after vaccination is 82% in adults.

Bacterial Vaginosis And Pregnancy

Bacterial vaginosis is the most common cause of abnormal vaginal discharge. It is due to the overgrowth of normal vaginal inhabitants. These include anaerobic bacteria and *Gardenerella vaginalis.* This overgrowth results in a thin, homogeneous, grey-colored, fishy smelling vaginal discharge. The factors that precipitate bacterial overgrowth have not yet been identified.

The diagnosis of bacterial vaginosis is based on a vaginal pH of greater than 4.7, clue cells on wet mount and the presence of the fishy amine odor with the addition of 10% potassium hydroxide (KOH). The absence of white cells and lactobacillus also support the diagnosis. Bacterial vaginosis is not considered a sexually transmitted disease.[17] It is reported to be present in 10% to 41% of all women, and 50% of all cases are asymptomatic.[18]

Bacterial Vaginosis And Obstetrical Outcomes

Several trials have demonstrated adverse obstetrical outcomes associated with bacterial vaginosis infection during pregnancy. Increased rates of spontaneous abortions, preterm labor, preterm birth, preterm rupture of membrane, amniotic fluid infection, endometritis and postcesarean section wound infection have all been associated with bacterial vaginosis.[18-21] Some studies, however, show no association. The majority of studies are case series and not prospective studies.

Bacterial vaginosis appears to be more common in African-American women. The reason for this is unclear. Measures of socioeconomic status do not explain the difference in infection rates between African-American and Caucasian females.[22] The greatest link between bacterial vaginosis and adverse obstetrical outcomes is seen in patients with the following characteristics:

- Previous preterm birth;
- Previous low-birth-weight baby;
- African-American race;
- Underweight;
- Unmarried; and
- Low incomes.[21]

Bacterial Vaginosis Treatment And Outcomes

There are many trials looking at the treatment of bacterial vaginosis and obstetrical outcomes. Some of these trials are positive and some are negative. A meta-analysis of five randomized, controlled trials by the Cochrane database in 2000 demonstrated antibiotic therapy was highly effective at eradicating bacterial vaginosis infection during pregnancy (odds ratio [OR 0.22], confidence interval [CI] 0.17 to 0.27). There was a trend toward fewer preterm births in those treated for bacterial vaginosis (OR 0.78, CI 0.60

to 1.02), and prevention of preterm birth was most marked in the subgroup of females with a previous preterm birth (OR 0.37, CI 0.23 to 0.60). Evidence obtained from this meta-analysis did not support screening all pregnant women for bacterial vaginosis.[23]

Bacterial Vaginosis Screening And Treatment

It has been proposed that only women who are symptomatic for bacterial vaginosis or who are at high risk of preterm labor or preterm rupture of membranes, be screened for bacterial vaginosis.[24] If screening is warranted, it should be done prior to 24 weeks gestation because all women will need to be retested later in the pregnancy. Retesting for bacterial vaginosis is warranted, as 20% to 40% will need repeat treatment. Systemic therapy with metronidazole 250 mg to 500 mg three times daily for seven days is recommended and has been felt to be superior to local therapy (*i.e.*, vaginal antibiotic creams).[25,26] Metronidazole is considered safe in pregnancy.[27]

Bottom Line For Bacterial Vaginosis And Pregnancy

Do not screen all pregnant women for bacterial vaginosis. Screen only if the patient is symptomatic or if there is a history of preterm birth (Figure 3). Treat if the patient is positive with systemic therapy, using flagyl, and remember to retest for bacterial vaginosis after therapy is complete. CME

Erratum:
A section of the article "Keeping Patients Healthy Abroad" (November 2001) was inadvertently omitted at press time. To obtain a complete copy of the article, please contact *The Canadian Journal of CME* at cme@sta.ca or call 204-475-4645. We apologize for the inconvenience.

Erratum:
In the article entitled, "Polycystic Ovarian Syndrome in Clinical Practice" (December 2001), under the section on Investigation, the units for DHEAS should have read µmol, instead of nmol. We apologize for the error.

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