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TREATMENT OF COMMON INFECTIONS IN PREGNANCY AND THE PUERPERIUM

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INTRODUCTION

The use of antimicrobial agents constitutes an important part of the management of infections in pregnancy and the puerperium. It is well documented that the prescribing of antibiotics is less than ideal and gynaecologists appear to be the

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worst offenders, one study showing their therapy to be irrational in 50% of patients (Achong *et al.*, 1977). Even discounting the economic consequences of unnecessary prescribing, antimicrobial agents may effect the care of patients by initiating adverse reactions to their presence and by their effect on the bacterial populations.

PRINCIPLES OF MANAGEMENT OF INFECTIONS

The mere presence of an infection does not automatically indicate a need for treatment. The infection may be self limiting, there may be no effective therapy, or the side effects of treatment may be more harmful than the original condition.

The underlying cause of the infection must be established whenever possible. Antimicrobial treatment of peritonitis is not the appropriate therapy if the underlying cause is acute appendicitis. When pus is present, it must be evacuated. This may be all that is necessary for the condition to resolve, as with a Bartholin's abscess.

If antimicrobial therapy is indicated, it should be tailored to the nature of the infecting organism. This may be evident from the nature of the disease or from initial clinical and laboratory investigations. Often isolation of the responsible organism will take until the following day or longer, and antimicrobial sensitivity patterns a further time. It then becomes necessary to commence treatment on a "best guess" of the nature of the infecting organisms and their likely drug sensitivities in the particular hospital or community, revising therapy when the definitive microbiological reports become available. The duration of treatment should be as short as possible consistent with cure. This may be for a fixed time, often 5 days, or for 48 hours after complete clinical regression of signs of infection.

The risks of therapy should be minimised by enquiring for any history of drug rashes or anaphylaxis or of impaired renal function. Consideration must be given to the dangers of ototoxicity, hepatotoxicity, bone marrow depression, peripheral neuropathy and encephalopathy, and gastro-intestinal reactions, both in the woman and the fetus or neonate.

When using more than one antimicrobial agent it is said that bactericidal drugs should not be used together with bacteristatic. This is not important in practice and combinations such as metronidazole with tetracyclines or erythromycin may be administered for appropriate infections, such as pelvic anaerobic sepsis associated with *Chlamydia trachomatis* or *Mycoplasma hominis.*

The dangers of drug interactions and incompatibilities are lessened by familiarity with a small number of commonly used agents and further information is readily available in the British National Formulary (1985) or the local hospital drug information centre.

ANTIMICROBIAL AGENTS

Treatment should be based on the sensitivity patterns of the organisms involved, using antimicrobials highly active against the infecting agent, rather than the most recently introduced ultra wide spectrum medication. The clinician should

be familiar with particular problems associated with infection in his community. Thus a high incidence of hospital acquired infection associated with *Klebsiella spp* resistant to gentamicin might indicate that a different drug would be the agent of choice. Close cooperation between clinician and microbiologist will result in optimum patient care and every hospital should have an agreed policy for antimicrobial therapy decided and accepted by all directly concerned with the clinical care of patients.

BETA-LACTAM ANTIBIOTICS. Penicillins and cephalosporins have a unique action on the bacterial cell wall, hence the enormous safety of this group of antimicrobials. Major toxic effects are rare, although hypersensitivity reactions are relatively common, particularly with ampicillin where cutaneous reactions are seen in 5% of patients treated (Alanis and Weinstein, 1983).

Benzylpenicillin remains the drug of choice for group B streptococci and sensitive strains of *Neisseria gonorrhoeae.* Flucloxacillin is the preferred therapy for infection with *Staphylococcus aureus* as most of these organisms produce beta-lactamase and are resistant to penicillin.

Ampicillin and amoxycillin are widely used in obstetrics for urinary tract infections and are particularly indicated for infections with *Streptococcus faecalis.* They are active against the majority of enterobacteriaceae but may provoke candida infections, antibiotic-associated colitis or cutaneous reactions.

Ticarcillin, piperacillin or azlocillin, together with gentamicin, are indicated in the treatment of infections with *Pseudomonas spp.* It should be emphasized that although colonization with pseudomonas is common, true infections are rare.

The cephalosporins have been called a powerful group of antibiotics with rather few specific indications. Although cross sensitization may occur between penicillins and cephalosporins, in clinical practice such reactions are rare and cephalosporins may be used in patients who are allergic to penicillin (James and Thomson, 1981). They are active against all but the "methicillin resistant" strains of *Staphylococcus aureus* and are used to treat infections from this agent either alone or with flucloxacillin. They should be used cautiously in patients on diuretics and their wide spectrum of activity may give trouble from antibiotic-induced colitis and from haemorrhagic disorders. Their lack of toxicity is an advantage in the treatment of urinary infections in patients with poor renal function.

AMINOGLYCOSIDES. The drugs in this group are among the most valuable currently available for treatment of serious or life-threatening infections caused by enteric Gram-negative bacteria, although strains resistant to these antibiotics have emerged in recent years. They are the most likely of the antimicrobials to provoke severe reactions and are not generally used in pregnancy because of the risk of ototoxicity to the fetus. This is of a low order with gentamicin and tobramycin, but substantial with streptomycin and kanamycin. When using aminoglycosides the dosage must be regulated by assay of serum trough and peak levels at the time of the third dose. The peak serum concentration of gentamicin should be at least 5 mg/l with a trough level of under 2 mg/l. A trough level over this value indicates in-

sufficient excretion, whilst a peak level of more than 10 mg/l indicates a dangerously high concentration. Adjustment of the dose is necessary in 60% of cases.

TETRACYCLINES AND ERYTHROMYCIN. These are bacteristatic with a broad spectrum of activity and are used for the treatment of infections due to *Chlamydia* and *Mycoplasma.* Tetracyclines are contraindicated in pregnancy when erythromycin should be used, although not as the estolate which is hepatotoxic.

NITROIMIDAZOLES. Metronidazole is a powerful anaerobicide with no general action on other bacteria. It is particularly indicated in pelvic sepsis where anaerobes are opportunist invaders responsible for most of the infective process following in the wake of trauma or other microbial agents.

SPECIFIC INFECTIONS

It is not possible in this review to deal exhaustively with infections complicating pregnancy and the puerperium, but certain topics have been selected on account of the particular problems which they present.

TUBERCULOSIS. The management of previously untreated tuberculosis in the non pregnant patient has become standardized in Great Britain, regardless of the site of the infection (Crofton and Douglas, 1981). Resistant organisms constitute a problem, particularly in Asian immigrants, and it is essential before commencing treatment to provide the microbiologist with a suitable specimen for culture and sensitivity patterns, results for which may take 6-8 weeks.

Therapy is commenced with three drugs –rifampicin, iosiazid and ethambutol – one of which, usually ethambutol, is discontinued when the sensitivity patterns become known. The total duration of treatment is for nine months.

Rifampicin is given in a dose of 600 mg (450 mg if the body weight is less than 50 kg), isoniazid 300 mg, ethambutol 15 mg/kg body weight, all drugs being administered as a single daily dose. Compliance is checked by testing the urine for rifampicin at each attendance and, if it appears that the woman is not taking her treatment, she should be closely supervised, by hospital admission if necessary. Steroids are not given unless the patient is acutely ill from her disease or, sometimes, in the presence of a tuberculous effusion.

Pregnancy is best deferred until a course of antituberculous therapy is completed, but it is not uncommon for women to be found to be pregnant whilst undergoing treatment, sometimes as a result of the liver enzyme inducing properties of rifampicin which interfere with the action of oral contraceptives.

Streptomycin, not generally used in treatment nowadays, should not be given in pregnancy because of its ototoxicity, one-sixth of exposed fetuses developing hearing loss or vestibular defects. The ototoxicity is independent of the critical period early in embryogenesis which is usually important in the production of teratogenic effects.

Although it is advised that rifampicin should not be used in the first trimester, the risks to the fetus are not known with certainty due to the small numbers re-

ported (Snider *et al.*, 1980). Limb reduction and CNS malformations are possible hazards. Rifampicin may also increase the risk of neonatal hypoprothrombinaemia and is excreted in small quantities in breast milk. In practice, many chest physicians continue to use rifampicin in the first trimester, although ethambutol plus isoniazid is the safest two drug combination.

URINARY TRACT INFECTIONS. It is said that acute urinary tract infections respond to anything but chronic urinary tract infections respond to nothing. In patients with symptomatic infections treatment should be instigated with amoxycillin immediately following the taking of specimens. If the woman is vomiting, or this is induced by therapy, she should be admitted to hospital and given amoxycillin or cefuroxime by injection, changing to oral administration when the acute symptoms subside. Dosage should be at twice the level given to non-pregnant women and the initial course of therapy should last for seven days (Smith and Brumfitt, 1983). In asymptomatic bacteriuria pregnancy precipitates acute pyelonephritis in 30% and antimicrobial treatment will reduce the risk of this complication to less than 5%. Short term therapy of three days at the most, or even single dose treatment, is efective for asymptomatic bacteriuria.

It is important to follow these women to ensure that their infections have cleared following the initial course of therapy. Recurrences or reinfections should be treated energetically and the 10% of originally infected patients who are not cured following a second course of treatment should be put on long term therapy with amoxycillin or an oral cephalosporin, administered nightly until after delivery, when the mother can be investigated for any underlying renal tract abnormality.

VAGINAL INFESTATIONS. The treatment of vaginal infections should follow conventional lines as for treatment of non-pregnant women. It is important to distinguish between a symptomatic discharge and mere colonization.

Group B streptococcus. Despite the threat to the neonate from this organism, no attempt should be made to treat the pregnant woman before the onset of labour as it is impossible to eradicate vaginal colonization with this potential pathogen. Therapy with benzylpenicillin during labour, as a form of early treatment, will minimize the risk to the baby.

Chlamydia trachomatis. When chlamydia is known to be present, the woman should be treated with erythromycin and her partner treated, as the presence of this organism may lead to an increased fetal wastage (Martin *et al.*, 1982) and puerperal pelvic inflammatory disease (Wager *et al.*, 1980) as well as neonatal infection.

Candida albicans. Despite the advent of imidazoles, nystatin is generally considered the treatment of choice. The incidence of candidosis increases during pregnancy and eradication becomes more difficult. Two nystatin pessaries should be inserted nightly for two weeks together with cream to the vulva if this is affected, and the husband should be treated. Where there is recurrence or reinfection, a further six week course should be given. The use of tampons to retain pessaries during the day is best avoided in pregnancy.

CHORIOAMNIONITIS. Membrane rupture may be followed by ascending infection, particularly when delivery is delayed, either because of fetal immaturity, or for administered corticosteroids to have sufficient time to affect fetal lung maturation. Broad spectrum antimicrobial agents are commonly given for prophylaxis, but there is little evidence that they are effective and the fetus and mother may still become infected, but with resistant organisms. Although vaginal colonization with anaerobes decreases during pregnancy, these organisms are frequently found in association with chorioamnionitis (Evaldson *et al.*, 1982). Metronidazole is safe for prophylaxis, but other agents should not be given in the absence of infection, the presence of which is an indication for delivery, however premature the fetus.

PUERPERAL SEPSIS. Infection following delivery is usually polymicrobial with a preponderance of anaerobic pathogens.

Infection of a perineotomy incision or tear should be treated by removal of sutures to allow drainage. The wounds usually heal perfectly by second intention and under no circumstances should resuture be attempted in the presence of any residual infection.

Pelvic sepsis is usually associated with tissue trauma, particularly from caesarean section where, following operation, infection may spread to the pelvic cellular tissues or to the abdominal wound.

Energetic treatment of such infections should be instituted immediately following the taking of specimens, including blood-cultures, for microbiological examination. Broad spectrum therapy with a combination such as gentamicin, amoxycillin and metronidazole should be used unless the sensitivity patterns of the infective agents commonly found in the hospital dictate otherwise. Treatment can be modified when the definitive results of the laboratory investigations become available. It is important to differentiate between those bacteria playing an integral part in the infection and those merely colonizing the wound or vagina.

If the infection is not responding to treatment within 48 hours, the patient should be carefully reviewed, as there may be an accumulation of pus which needs to be drained, or unrecognized bowel perforation following obstetrical procedures (Tomkinson *et al.*, 1982).

CONCLUSION

Effective antimicrobial therapy, as part of the management of infection, is best achieved by close cooperation between clinician and microbiologist in the context of an approved hospital antimicrobial policy.

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TREATMENT OF SEXUALLY TRANSMITTED DISEASES

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INTRODUCTION

There are a large number of sexually-acquired conditions that present to the obstetrician and gynaecologist as well as the physician in genito-urinary medicine. This paper concentrates on the treatment of women and neonates suffering from chlamydial, gonococcal and syphilitic infections.

CHLAMYDIAL INFECTIONS

The isolation rate for *Chlamydia trachomatis* varies from 2 to 60%, depending on the types of patients surveyed (table 1). The fact that a high proportion of women in whom chlamydia can be isolated are not attending departments of genito-urinary medicine should make gynaecologists and obstetricians continually vigilant for the possibility that this condition exists in their patients in an asymptomatic form.

The treatment of uncomplicated chlamydial cervicitis in the female patient is with tetracycline 250 mg q.d.s. for one to two weeks. In the pregnant woman tetracycline should be avoided in the second and third trimester and erythromycin stearate 250 mg q.d.s. for one to two weeks is recommended.

In the neonate, *Chlamydia trachomatis* can be transmitted by direct inoculation and gives rise to a conjunctivitis or pneumonia. Table 2 indicates the proportion of infants born to infected mothers who will develop various manifestation of chlamydial infection. A chlamydial ophthalmia neonatorum is now aproximately five times more common than a gonococcal ophthalmia. The obstetrician, even though remembering that these two conditions are not the commonest

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