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Review

Viral infections in pregnancy: advice for healthcare workers

T.L. Chin [a,*], A.P. MacGowan [a], S.K. Jacobson [a], M. Donati [b]

[a] Southmead Hospital, North Bristol NHS Trust, Bristol, UK
[b] Public Health England, Bristol Public Health Laboratory, Department of Virology, Bristol, UK

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SUMMARY

Background: Healthcare workers (HCWs) have the potential for increased exposure to infectious disease resulting from the provision of patient care. Pregnancy can confer specific problems in some infections for the mother and her unborn child.

Aims: To discuss the viral infections encountered in the UK that constitute a particular risk to the pregnant HCW: human immunodeficiency virus, hepatitis B virus, hepatitis C virus, varicella-zoster virus, herpes simplex virus, human parvovirus B19, cytomegalovirus, rubella, measles, enteroviruses, mumps and influenza. Evidence for nosocomial transmission, clinical aspects specific to pregnancy, and recommendations to protect the pregnant HCW at work are included.

Methods: Medline, EMBASE and Pubmed were searched using a list of keywords specific to each viral infection, including 'nosocomial', 'occupational' and 'healthcare workers'. References from the bibliographies of articles identified were reviewed for relevant material.

Findings: The evidence for increased risk in the healthcare setting for many of these infections, outside of outbreaks, is weak, possibly because of the application of standard protective infection control measures or because risk of community exposure is greater. The pregnant HCW should be advised on protective behaviour in both settings. Potential interventions include vaccination and reducing the likelihood of exposure through universal precautions, infection control and redeployment.

Conclusion: Protection of the pregnant HCW is the responsibility of the individual, antenatal care provider and employer, and is made possible through awareness of the risks and potential interventions both before and after exposure. If exposure occurs or if the HCW develops an infective illness, urgent specialist advice is required.

Introduction

In the context of infectious diseases, healthcare workers (HCWs) accept the potential for increased pathogen exposure resulting from the provision of patient care. In recognition of this risk, all efforts must be made to protect patients and staff from hospital-acquired infections. Pregnancy can confer specific problems in some infections for both the mother and her unborn child.

This review will discuss the viral infections encountered in the UK that constitute a particular risk to the pregnant HCW, namely human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), varicella-zoster virus (VZV),

* Corresponding author. Address: Department of Microbiology, Southmead Hospital, Westbury-on-Trym, Bristol BS10 5NB, UK. Tel.: +44 (0) 117 323 5651; fax: +44 (0) 117 323 8513.
E-mail address: lichin@doctors.org.uk (T.L. Chin).

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herpes simplex virus (HSV), human parvovirus B19, cytomegalovirus (CMV), rubella, measles, enteroviruses, mumps and influenza. Evidence for nosocomial transmission, clinical aspects specific to pregnancy, and recommendations to protect the pregnant HCW at work will be included. The evidence for increased risk in the healthcare setting for many of these viral infections, outside of outbreaks, is weak or absent, possibly because of the application of standard protective infection control measures or because the risk of community exposure often outweighs any healthcare-associated risk. This review will serve to increase awareness of standard practices and the options for management, whilst noting that expert advice should be sought in each case.

Methods

Medline, EMBASE and Pubmed were searched using a list of keywords specific to each viral infection, and including 'nosocomial', 'occupational' and 'healthcare workers'. Additional references from the bibliographies of the articles identified were also reviewed for relevant material.

Blood-borne viruses

Human immunodeficiency virus

Epidemiology. HCWs in resource-poor countries have a higher risk of occupational exposure to blood-borne viruses due to a higher prevalence of blood-borne diseases and unsafe practices.[1] In the UK, an estimated 96,000 people were living with HIV by the end of 2011. The overall prevalence was 1.5 per 1000 population, with the highest rates reported among men who have sex with men (47 per 1000) and the black African community (37 per 1000).[2] The prevalence of HIV in healthcare settings will vary according to the characteristics of the local population, but is likely to be higher than in the general population. Approximately 24% of people with HIV were unaware of their infection in 2011.[2]

Transmission. HIV is transmitted as a result of contact with infected blood and body fluids. The average risk of HIV transmission after percutaneous exposure to HIV-infected blood in healthcare settings is approximately three per 1000 injuries.[3] Increased risk is associated with percutaneous exposures involving a larger quantity of blood and if the patient's viral load is high.[3] Mucocutaneous exposure carries an infection risk estimated at less than one in 1000.[3] Risk of transmission following a bite will depend on the severity of the incident, the patient's oral hygiene and the stage of the disease.[4]

In the UK, there have been five documented and 47 probable HIV transmissions in HCWs following exposure to HIV-positive source patients since 1984. The last case of HIV seroconversion in an occupationally exposed HCW was reported in 1999.[5]

Clinical aspects directly relevant to pregnancy. Infection with HIV during pregnancy complicates antiretroviral treatment and risks mother to child transmission (MTCT) through exposure *in utero*, at delivery or through breast feeding. In the UK, the MTCT rate has been reduced from approximately 26% to less than 1% with interventions such as antiviral treatment for the mother and prophylaxis for the baby.[6] A small proportion of HIV-positive women remain undiagnosed at delivery in the UK; therefore, an estimated 2% of all HIV-exposed infants are infected vertically.[6]

Healthcare worker protection. Standard infection control precautions (SICPs), including use of gloves, aprons, protective face/eyewear, and correct sharps handling procedures, can prevent the majority of mucocutaneous and percutaneous exposures to blood-borne pathogens.[7,8]

Post-exposure care. HCWs should be aware of local protocols for the management of potential blood-borne virus exposure. After immediate first aid, there should be prompt risk assessment regarding the need for antiretroviral post-exposure prophylaxis (PEP). It is recommended that PEP should be given within 1 h of exposure, but not more than 72 h after exposure.[3] The protective efficacy of HIV PEP is estimated at approximately 80%. Occupationally acquired HIV infection has been described despite PEP.[9] If PEP is commenced, testing for HIV status of the source individual should determine whether to continue prophylaxis for the recommended 28 days.[10]

Impact on employment of infection or exposure in pregnancy. There is no need for HCWs to avoid performing exposure-prone procedures (EPPs) pending serological follow-up after occupational exposure to any of the blood-borne viruses.[3] In the UK, HIV-infected HCWs are currently restricted from performing EPPs.[11] Worldwide, four untreated infected HCWs (none in the UK) are reported to have transmitted HIV infection to patients; therefore, it has been proposed that HIV-infected HCWs should be permitted to perform EPPs if they are on effective antiretroviral therapy.[11] Guidelines in the USA have proposed allowing unrestricted clinical practice for HIV-infected HCWs with low viral load.[12] Australian guidelines prevent HCWs from performing EPPs if they are HIV antibody positive, even if virus levels become undetectable on antiretroviral therapy.[13]

Hepatitis B virus

Epidemiology. The UK has low endemicity for chronic hepatitis B, of the order of 0.3%.[14] However, in areas of high endemicity, such as parts of south-east Asia and sub-Saharan Africa, the prevalence of HBsAg is 8–20%, and approximately 70–90% of the population become infected with HBV before 40 years of age.[15] Risk groups in England and Wales include injecting drug users, people who change sexual partners frequently, and individuals from or travelling in high-prevalence areas.[16] The prevalence of HBV in hospitalized patients will reflect the characteristics of the local population.

Transmission. HBV is transmitted through mucosal or percutaneous exposure. The average risk of infection following a percutaneous injury to a non-immune individual is approximately 30% when the source patient is HBeAg positive,[17] and in almost all reported cases transmission occurred when the source viral load was $>10^5$ geq/mL.[18] Risk of transmission following mucocutaneous exposure is poorly defined. MTCT occurs perinatally *in utero* or mucocutaneously. Worldwide, 37% of cases of hepatitis B among HCWs are estimated to result from occupational exposure.[19]

Clinical aspects directly relevant to pregnancy. Pregnant women with HBV mono-infection typically have a similar course as the non-pregnant population.[6] In contrast, HIV/HBV co-infection is associated with higher morbidity and mortality than either infection alone.[6] An increased rate of miscarriage