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Parvovirus B19 Infection in Pregnancy

This Clinical Practice Guideline has been prepared by the Maternal Fetal Medicine committee, reviewed by Infectious Disease and Family Physician Advisory Committees, and approved by the Executive and Council of the Society of Obstetricians and Gynaecologists of Canada.

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Abstract

Objectives: This guideline reviews the evidence relating to the effects of parvovirus B19 on the pregnant woman and fetus, and discusses the management of women who are exposed to, who are at risk of developing, or who develop parvovirus B19 infection in pregnancy.

Outcomes: The outcomes evaluated were maternal outcomes including erythema infectiosum, arthropathy, anemia, and myocarditis, and fetal outcomes including spontaneous abortion, congenital anomalies, hydrops fetalis, stillbirth, and long-term effects.

Evidence: Published literature was retrieved through searches of PubMed and The Cochrane Library on July 8, 2013, using appropriate controlled vocabulary (MeSH terms "parvovirus" and "pregnancy") and key words (parvovirus, infection, pregnancy, hydrops). Results were restricted to systematic reviews, randomized control trials/controlled clinical trials, and observational studies. There were no date restrictions but results were limited to English or French language materials. Grey (unpublished) literature was identified through searching the websites of health technology assessment and health technology assessment-related agencies, clinical practice guideline collections, and national and international medical specialty.

Values: The quality of evidence in this document was rated using the criteria described in the Report of the Canadian Task Force on Preventive Health Care (Table 1).

Recommendations

1. Investigation for parvovirus B19 infection is recommended as part of the standard workup for fetal hydrops or intrauterine fetal death. (II-2A)
2. Routine screening for parvovirus immunity in low-risk pregnancies is not recommended. (II-2E)
3. Pregnant women who are exposed to, or who develop symptoms of, parvovirus B19 infection should be assessed to determine whether they are susceptible to infection (non-immune) or have a current infection by determining their parvovirus B19 immunoglobulin G and immunoglobulin M status. (II-2A)
4. If parvovirus B19 immunoglobulin G is present and immunoglobulin M is negative, the woman is immune and should be reassured that she will not develop infection and that the virus will not adversely affect her pregnancy. (II-2A)

Table 1. Key to evidence statements and grading of recommendations, using the ranking of the Canadian Task Force on Preventive Health Care

Quality of evidence assessment*	Classification of recommendations†
I: Evidence obtained from at least one properly randomized controlled trial	A. There is good evidence to recommend the clinical preventive action
II-1: Evidence from well-designed controlled trials without randomization	B. There is fair evidence to recommend the clinical preventive action
II-2: Evidence from well-designed cohort (prospective or retrospective) or case–control studies, preferably from more than one centre or research group	C. The existing evidence is conflicting and does not allow to make a recommendation for or against use of the clinical preventive action; however, other factors may influence decision-making
II-3: Evidence obtained from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of treatment with penicillin in the 1940s) could also be included in this category	D. There is fair evidence to recommend against the clinical preventive action
	E. There is good evidence to recommend against the clinical preventive action
III: Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees	L. There is insufficient evidence (in quantity or quality) to make a recommendation; however, other factors may influence decision-making

*The quality of evidence reported in these guidelines has been adapted from The Evaluation of Evidence criteria described in the Canadian Task Force on Preventive Health Care.[87]

†Recommendations included in these guidelines have been adapted from the Classification of Recommendations criteria described in the Canadian Task Force on Preventive Health Care.[87]

5. If both parvovirus B19 immunoglobulin G and immunoglobulin M are negative (and the incubation period has passed), the woman is not immune and has not developed the infection. She should be advised to minimize exposure at work and at home. Absence from work should be considered on a case-by-case basis. (II-2C) Further studies are recommended to address ways to lessen exposure including the risk of occupational exposure. (III-A)
6. If a recent parvovirus B19 infection has been diagnosed in the woman, referral to an obstetrician or a maternal–fetal medicine specialist should be considered. (III-B) The woman should be counselled regarding risks of fetal transmission, fetal loss, and hydrops and serial ultrasounds should be performed every 1 to 2 weeks, up to 12 weeks after infection, to detect the development of anemia (using Doppler measurement of the middle cerebral artery peak systolic velocity) and hydrops. (III-B) If hydrops or evidence of fetal anemia develops, referral should be made to a specialist capable of fetal blood sampling and intravascular transfusion. (II-2B)

INTRODUCTION

Parvovirus B19 is a single-stranded DNA virus that is responsible for erythema infectiosum, a common childhood illness.[1] The virus was identified in 1975 during routine blood screening for hepatitis B surface antigen,[2] and was identified as the cause of erythema infectiosum in 1983.[3] It was subsequently linked to cases of non-immune hydrops and fetal death.[4–7] The B19 parvovirus strain infects only humans and animal strains infect only animals, not humans.[1]

ABBREVIATIONS

IgG	immunoglobulin G
IgM	immunoglobulin M
MCA	middle cerebral artery
MSAFP	maternal serum alpha fetoprotein
PCR	polymerase chain reaction

Parvovirus B19 is most commonly spread by respiratory secretions or from hand to mouth contact.[8] Other modes of transmission include blood product infusion and transplacental transfer. As the main mode of transmission is respiratory, epidemics of parvovirus B19 infection can occur. Outbreaks usually happen in spring (but can occur any time of the year), and mainly affect children aged 4 to 11. Outbreaks usually occur yearly, with larger epidemics every four to five years, and may last up to six months.[9–11] Most cases in pregnant women seem to occur in late spring and summer.[12] Viremia occurs 4 to 14 days after exposure and may last up to 20 days.[13] Fever and prodromal symptoms may develop in the last few days of the incubation period,[14] but many people remain asymptomatic. A rash and arthralgia may begin around day 15, by which time the person is usually no longer infectious. Current data suggest that infection with parvovirus B19 usually confers lifelong immunity.[14] Because outbreaks can be frequent and many infectious people are asymptomatic, encounters that risk exposure to parvovirus infection are often unrecognized.

Approximately 50% to 75% of women of reproductive age have developed immunity to parvovirus B19.[11,15–18] Without known exposure, about 1% to 3% of susceptible pregnant women will develop serologic evidence of infection in pregnancy,[16,19] rising to over 10% in epidemic periods.[10] Where there is extensive opportunity for exposure to parvovirus