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Parvovirus B19 infection: Timely diagnosis in pregnancy essential

G.J. Waring *

Fetal Medicine Unit, Newcastle upon Tyne Hospitals NHS Foundation Trust, Royal Victoria Infirmary, Queen Victoria Road, Newcastle upon Tyne NE1 4LP, UK

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Those familiar with providing maternity care will be aware that a delay in diagnosis can mean the difference between a good outcome and a devastating one. In the field of fetal medicine there are relatively few proven efficacious interventions. However, in the case fetal infection with parvovirus B19, with timely diagnosis and management disaster can often be averted.

Human parvovirus B19 is endemic to most of the developed world. It is known as slapped cheek syndrome or 5th disease (behind measles, scarlet fever, rubella and Duke's disease). Whilst being the most common cause of rash in school children it is also a particular concern in pregnancy. Though the majority of the pregnant population, around 60%, have been exposed to this virus there is still a lot of susceptible pregnant women [1]. Based on public health England reports there are over 1000 new cases per annum of laboratory confirmed parvovirus B19 infections in women of a reproductive age. The incidence of infection in pregnancy is 1–2% though during an epidemic, which is typically late winter to early spring, the incidence can be as high as 10%. All pregnant women with a new onset generalised rash should undergo testing for parvovirus B19. As the rash caused by parvovirus B19 is clinically indistinguishable from rubella this should also be tested for. Pregnant women with a potentially significant exposure to parvovirus B19 should also be tested, this is defined as face to face contact with an infected individual or being in the same room for 15 min or more.

Vertical transmission occurs in 30% of cases. Fetal sequelae includes miscarriage, non immune hydrops and intrauterine death. This can occur through inflammation of the placenta, liver and myocardium but the majority of adverse outcomes come as result of profound fetal anaemia. Parvovirus B19 has a predilection for rapidly dividing cells and induces cytotoxic apoptosis and lysis of erythroid progenitor cells. This makes the fetus particularly susceptible to the virus in the second trimester when haematopoiesis happens in the liver and there is a 34-fold increase in red cell mass with a reduction in the life span of the red blood cells [2].

The risk of fetal loss is stratified based on gestational age. Prior to 20 weeks there is 5–10% loss.

rate, this falls of 0.5% beyond this point.

Should fetal anaemia occur then the treatment is an intrauterine transfusion (IUT) of red cells. Monitored and transfused appropriately, the perinatal survival rates are as high as 85%. A delay in diagnosis of fetal anaemia may increase the risk of fetal hydrops and thrombocytopenia.

Up to 50% of infected women may be asymptomatic. Unless women are aware they have potentially been exposed to parvovirus B19 these

* Corresponding author.
E-mail address: gareth.waring@ncl.ac.uk.

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cases are then destined to present late so one should always have a high degree of suspicion when confronted by fetal ascites or pericardial effusions on ultrasound, particularly in combination.

The risk of hydrops is low overall with studies estimating the incidence of 3–6%, but in those pregnancies that are complicated by this the rate of fetal loss can be as high as 50% [1]. This is a reflection that the development of hydrops is a marker of severe anaemia and late stage disease. De Jong et al. looked at the incidence of severe neurodevelopmental delay following IUT for anaemia caused by parvovirus B19, though their numbers were relatively small, the rate was 11% and all the fetuses in their study had developed hydrops [3]. The LOTUS study looked at neurodevelopment outcomes in fetuses that underwent IUT for haemolytic disease/alloimmunisation. The numbers were much larger and the study found that severe hydrops independently increased the odds of neurodevelopment delay, anaemia without hydrops did not. In keeping with the findings or De Jong et al., the rate of severe neurodevelopmental delay in fetuses affected by hydrops was 12% [4]. These findings suggest that the development of hydrops increases both mortality and long term morbidity for the fetus.

The rate of parovirus B19 induced fetal thrombocytopenia is estimated to be between 15 and 54%. Like hydrops it appears to be a feature of late disease in that it is associated with higher severity of anaemia. Fetal thrombocytopenia is associated with an increased risk of fetal loss within 48 h of an IUT. The timing here suggests the mechanism of loss is by fetal haemorrhage as a result of the thrombocytopenia. Melamed et al. found the rate of severe thrombocytopenia in parvovirus B19 infected fetuses under going fetal blood sampling was 38%, of these fetuses 86% also had fetal hydrops [5].

Thus the challenge in cases at risk of fetal anaemia secondary to parvovirus B19 is to monitor these pregnancies effectively in order to intervene in a timely fashion. Monitoring for fetal anaemia can be done reliably using fetal dopplers. The peak systolic velocity (PSV) of the waveform in the middle cerebral artery (MCA) can detect moderate to severe fetal anaemia with a sensitivity of 100% (95% CI 0.86–1.00) and a false positive rate of 12%. Previous guidance of the management of this condition had suggested waiting until hydrops was preset prior to referring on to a fetal medicine specialist [2]. There is thankfully now a consensus that upon diagnosis of the maternal infection the woman should be referred to a clinician that is able to perform screening for fetal anaemia using MCA dopplers and they in turn should either be able to perform or refer onto a specialist in fetal medicine that can perform an FBS/IUT in cases of suspected fetal anaemia [6].

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References

[1] To M, M. Kidd, Prenatal diagnosis and management of fetal infections, Obstetrician & Gynaecol. (2009)https://doi.org/10.1576/toag.11.2.108.27484.
[2] R.F. Lamont, J.D. Sobel, E. Vaisbuch, et al., Parvovirus B19 infection in human pregnancy, BJOG Int. J. Obstet. Gynaecol. 118 (2) (2011) 175–186, https://doi.org/10.1111/j.1471-0528.2010.02749.x.
[3] E.P. De Jong, I.T. Lindenburg, J.M. van Klink, et al., Intrauterine transfusion for parvovirus B19 infection: long-term neurodevelopmental outcome, Am. J. Obstet. Gynecol. 206 (3) (2012) 204.e1–204.e5, https://doi.org/10.1016/j.ajog.2011.12.035.
[4] N. Melamed, W. Whittle, E.N. Kelly, et al., Fetal thrombocytopenia in pregnancies with fetal human parvovirus-B19 infection, Am. J. Obstet. Gynecol. 212 (6) (2015) 793.e1–793.e8, https://doi.org/10.1016/j.ajog.2015.01.048.
[5] I.T. Lindenburg, V.E. Smits-Wintjens, J.M. van Klink, et al., Long-term neurodevelopmental outcome after intrauterine transfusion for hemolytic disease of the fetus/newborn: the LOTUS study, Am. J. Obstet. Gynecol. 206 (2) (2012) 141.e1–141.e8, https://doi.org/10.1016/j.ajog.2011.09.024.
[6] National Institute for Health and Care Excellence, Parvovirus B19 Clinical Knowledge Summaries, 2017.