Hepatitis C: Is There a Case for Universal Screening in Pregnancy?

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Abstract
Hepatitis C (HCV) infection is not routinely screened for antenatally in all maternity hospitals. Most hospitals adopt a policy of targeted screening. The policy in the Coombe Women and Infants University Hospital in Dublin changed from targeted screening in 2006 to universal screening in 2007. We audited the two consecutive years. The prevalence of HCV in our antenatal population was 1.4% for 2006 (67/4666) when targeted screening applied and in 2007 - 0.71% (66/9222) when universal screening came into affect. One woman in 2007 would not have been detected by targeted screening - 1.49% (1/67). Fifty five percent (37/67) of women were HCV-RNA positive in 2006 and 57.5% (38/66) were positive in 2007. We conclude that there were similar detection rates for HCV in 2006 and 2007 and that universal screening is not required if inclusive criteria for selective screening are employed but is of use in a research context.

Introduction
Hepatitis C virus (HCV) infection is an emotive issue in Ireland since the contamination of anti-D immunoglobulin in the 1970s resulted in over seven hundred women becoming infected with the virus. HCV infection became a notifiable disease in 2004. From 2004 to 2007, 5,357 cases were identified. Approximately 35% of these were female with the highest rates of infection in the 20 to 64 year age group. Hepatitis C RNA virus was first detected in 1989 and is now a recognized global health problem. Worldwide it is estimated that 170 million people have chronic hepatitis C infection.

Six predominant genotypes exist, each having multiple subtypes. Transmission is mainly parenteral, through shared needles or equipment, or via infected blood products. The transmission rate has never been adequately explained or investigated and it is not merely associated with being PCR positive. Interventions such as delivery within a set time post rupture of membranes or elective Caesarean section have not been verified.

Perinatal and occupational transmission can also occur. The disease burden of Hepatitis C relates to the morbidity and mortality caused by complications of end stage liver disease. Acute infection is usually subclinical, with the majority of people unaware of their infection status. Eighty per cent become chronically infected with approximately 20 to 30% progressing to cirrhosis after 20 to 30 years. There is a 5% annual risk of developing hepatocellular carcinoma. Co-infection with Hepatitis B virus (HBV) or Human Immunodeficiency Virus (HIV) carries an increased risk of progression to cirrhosis or carcinoma.

There is no vaccine available. However, there is a treatment available: subcutaneous pegylated interferon alfa once weekly and oral ribavarin daily, which can achieve sustained response rates of 42 to 80% depending on the genotype. Mother to child transmission rates have been estimated at 6 to 15%. The transmission rate has never been adequately explained or investigated and it is not merely associated with being PCR positive. Interventions such as delivery within a set time post rupture of membranes or elective Caesarean section have not been verified.

It is argued that pregnant women should not be offered a HCV test antenatally because, unlike HBV infection where there is a vaccination available for the baby postnatally or HIV infection where the administration of highly active anti-retroviral treatment (HAART) to the mother antenatally can reduce mother to child transmission (MTCT), there is no intervention to reduce the transmission of HCV from mother to child. Therefore, it would appear that diagnosing HCV antenatally could only hope to benefit the mother postnataally. It is however accepted that targeted screening should apply to those at high risk of having HCV (e.g. Intravenous drug users -IVDU, foreign nationals, previous blood transfusion, previous jaundice etc) so that they may benefit from this knowledge. Unfortunately as of yet, no intervention can prevent their baby acquiring the virus.

Maternal HCV infection may be associated with adverse peripartum outcomes including a trend toward premature rupture of membranes (PROM) and an increased likelihood of a small for gestational age foetus (SGA), low birth weight (LBW) infants and an increased requirement for NICU admission. This would add weight to the argument for universal screening if surveillance of fetal growth is confirmed to be needed antenatally. In 2007, with the employment of a midwife practitioner and a consultant obstetrician with an interest in infectious diseases, the policy of targeted screening for HCV infection was changed and all antenatal women attending The Coombe Women and Infants University Hospital were offered screening for the virus. This study compares the final year of targeted screening with the first year of universal screening.

Methods
We retrospectively analysed the charts of hepatitis C positive mothers in two consecutive years, 2006 and 2007. In 2006, our hospital used targeted screening to detect potentially infected women but in 2007 universal screening was implemented. Our laboratory used the same analysis tool in both years. Screening criteria in 2006 were: presence of tattoos and body piercings; history of injecting drug use, blood products received, history of jaundice, sexual contact with potentially infected partner and being an immigrant from a country with moderate to high prevalence rate of HCV. Screening is done at the booking visit usually in the first trimester. We looked at the number of women...
infected with HCV, the number of women who were HCV RNA positive, the prevalence of HCV in our antenatal population, the age of women with HCV infection and the risk factors if any that were identified.

Results

Sixty seven cases of HCV were identified with targeted screening in 2006 and 66 cases identified in 2007 with universal screening. 55% (37/67) of women were HCV RNA positive in 2006 and 57.5% (38/66) were positive in 2007. The prevalence of Hepatitis C in our antenatal population was 1.4% (67/4666) for 2006 when targeted screening applied and 0.71% (66/9222) in 2007 when universal screening came into effect. Interestingly we estimated that the prevalence of HCV in our antenatal patients on a methadone programme (most of whom would have a past history of IVDU) is 34.7% (32/92). Three women were identified in 2006 who had co-infection with HIV and 4 in 2007. All were delivered by caesarean section. In the HCV infected population 27% (16/59) were delivered by caesarean section in 2006 and 14% (9/64) in 2007.

The average age of women who were hepatitis C positive in 2006 was 28.5 years and 29 years in 2007. The average weight of babies born to women who were Hepatitis C positive was 2.97 kg in 2006 and 3.17 kg in 2007. Prior history of drug use and tattoos and piercings were the biggest risk factors for Hepatitis C infection in 2006 and 2007. It is estimated that one woman in 2007 would not have been detected by targeted screening - 1.49% (1/67). This patient’s only risk factor was that she was a health professional, which would not have been part of the screening questions for those at high risk of infections with our targeted screening in 2006. Eight foreign nationals were identified as hepatitis C positive in 2006. Of these, 3 had additional risk factors (as outlined in screening questions in methods section) for contracting the virus and the remaining five had no additional risk factors. Twelve foreign nationals were identified in 2007 and 10 of these had no additional risk factors for contracting the virus.

Discussion

Our prevalence of HCV infection of 0.71% and 1.4% in the two years is similar to that found by Pembrey et al in a routine antenatal clinic in London in their 2003 study. Goldberg et al in Dundee as 46%. We can estimate that the prevalence of HCV in our antenatal patients on a methadone programme (most of whom would have a past history of IVDU) is 34.7% (32/92), confirming as in Dundee the much higher prevalence of HCV in IVDU patients. Estimating the prevalence of HCV infection helps to identify the magnitude of the disease burden in Ireland. Thus, help to organise the planning of future HCV infection related healthcare services. With regards to HCV RNA status, we found that 55% and 57% of women were positive in 2006 and 2007 respectively. Healy et al reported that 55% of their women were HCV-RNA positive in their Irish study in 2000. Floreani et al reported similar results - 64.2% of HCV positive women were HCV-RNA positive in their Italian study in 1996.

In their 2007 French study of 214 mother and child pairs, Marine-Barjoan et al reported a higher rate of 69%. Three women were identified in 2006 who had co-infection with HIV and 4 in 2007. All were delivered by caesarean section, in keeping with recommendations from most studies that have shown an increased risk of transmission of HCV with a vaginal birth in the presence of co-infection with HIV.

Is targeted screening enough in a population that has a low prevalence of this disease? Goldberg et al in Dundee in 1996 estimated that targeted screening failed to detect half their cases of hepatitis C, in particular the sexual partners of injecting drug users. In a Scottish study in 2003, Hutchinson et al demonstrated that targeted or selective screening failed to identify 72% of previously undetected HCV infections. Targeted screening relies heavily on accurate history taking and full disclosure from the patient. This may be unsatisfactory in many instances. With regard to foreign nationals, there may be a language barrier making history taking substandard. Also, with past IVDU there may be a wish for concealment especially if they are currently stable and off drugs. If all foreign nationals are screened, regardless of whether they are from a country of high endemicity or not, this may be seen as a form of discrimination.

The debate continues as to whether there is a need for screening, either targeted or universal, for hepatitis C infection in pregnancy. The general consensus is that while we have a reliable screening test, we do not have an intervention to prevent mother to child transmission. Thus our knowledge of a woman’s HCV status does not change our management of her pregnancy and labour (apart from coinfection with HIV). Thus, screening for HCV infection in pregnancy does not meet World Health Organization (WHO) criteria for screening. Delivery suite practices employed at present but which have not been verified include: Non use of foetal blood sampling and foetal scalp electrodes, Hepatitis C: Is There a Case for Universal Screening in Pregnancy? 2
induction of labour at term if spontaneous rupture of membranes, aiming to leave membranes intact as long as possible in labour and once ruptured expediting delivery with oxytocin, early review of baby by paediatric team.

Our study would appear to confirm that targeted screening for HCV infection is working well in Ireland and that few cases of hepatitis C infection escape detection. Approximately equal numbers of infection were detected with targeted screening in 2006 and universal screening in 2007. Therefore to answer our question posed in our title, we must conclude that universal screening for HCV infection is not required if inclusive criteria for selective screening are employed but is of value in the research context. More research is needed to determine what is best practice with regards to antenatal, intrapartum and postnatal interventions in women with Hepatitis C infection.

References