

RESULTS OF A PILOT HEPATITIS C SCREENING PROGRAM IN INFANTS BORN TO HIGH RISK MOTHERS

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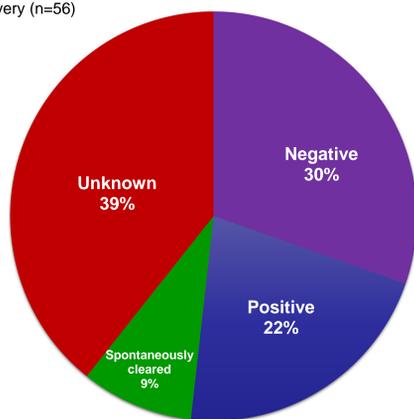
Background

- Hepatitis C virus (HCV) is a global health concern with an estimated 70 million cases worldwide.¹
- An estimated 11.5-21.2 million of these cases are thought to be in children aged 1 to 15 years.¹
- In the developing world, the majority of paediatric cases are due to vertical transmission,¹ whose rate is estimated to be 5-6%.²⁻⁴
- There is increasing prevalence of HCV in women of child bearing age in Canada.⁵
- Screening for hepatitis C in pregnancy is not routinely performed at most sites in Canada. Screening is also complicated by the need to screen after last known risk factor has occurred before delivery.
- Due to the placental transfer of maternal antibodies, confirmation of hepatitis C infection is often delayed until the baby is 12-18 months of age, however this may result in families being lost to follow up.⁶
- Only a few Canadian centres have a formal screening program for infants born to high risk mothers. Many primary care physicians and paediatricians do not have the awareness of when to appropriately screen high risk babies.

Methods

- A pilot program was instituted at the Saint John Regional Hospital in Atlantic Canada between January 2015 and August 2017 on the newborn ward to identify high risk mothers.
- High risk was defined as a mother who was at least one of the following: HCV positive, on opioid agonist therapy at delivery, and/or illicit drug use during pregnancy.
- The program sent a referral letter to each infant's primary care provider (PCP) at discharge outlining the need for the infant to be screened and instructions on when screening should occur. The letter also provided encouragement for PCPs to contact paediatrics or infectious disease specialists if further information was needed.
- This project outlined the characteristics of the mothers and infants at delivery, course in hospital and followed up on whether the infants were screened appropriately for HCV.

Figure 1: Confirmed hepatitis C status of mothers at the time of delivery (n=56)



Results

- A total of 56 children born to 52 different mothers were identified through the high risk screening program. This represents a rate of 1 to 2 high risk births for every 100 live births at our institution.
- Review of maternal risk factors and confirmed HCV status (Figure 1) at the time of delivery determined that 35 infants met the criteria for HCV screening.
- Of the 35 infants requiring HCV screening, 15 (38.5%) were screened.
- Of the 15 infants appropriately screened for HCV:
 - 13 (86.6%) confirmed to be HCV negative
 - 1 (6.7%) confirmed spontaneous clearance after 1 year of age
 - 1 (6.7%) HCV positive with detectable viral load after 18 months of age
- There were 94 children that had been born previously to these 52 mothers, with 20.2% (19) born to HCV positive mothers and 41.5% born to women of unknown HCV status.

Table 1: Maternal characteristics at delivery (n=56)

| | |
|--|------------------------|
| Average age at delivery, # (range) | 27.0 years (18.5-38.0) |
| Documented lack of adequate prenatal care, % (n) | 60.7% (34) |
| Prescribed methadone during pregnancy, % (n) | 80.4% (45) |
| Mothers with children prior to this pregnancy, % (n) | 75.0% (43) |
| Custody status of prior children at the time of birth, % (n) | |
| - Full custody of all children | 51.8% (15) |
| - Full custody of some children | 24.0% (7) |
| - No custody of any children | 20.7% (6) |
| - Unknown custody status | 3.5% (1) |

Figure 2: Maternal substance use during pregnancy (by patient self report or urine drug screen)

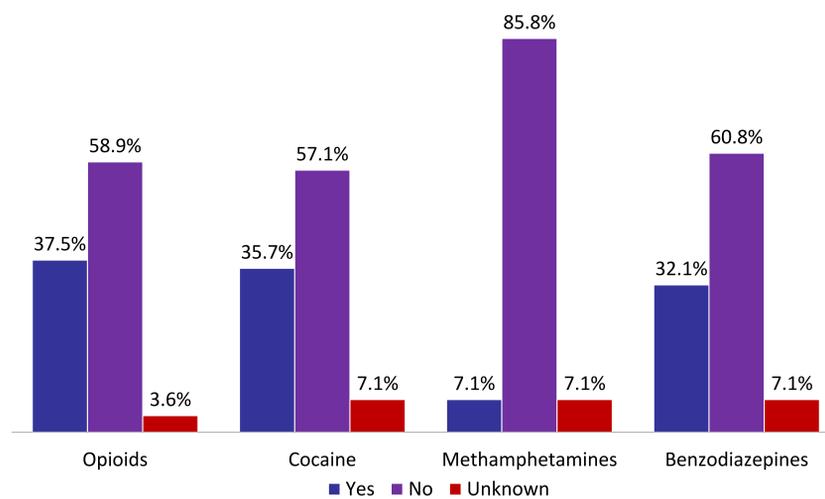


Table 2: Infant characteristics at delivery and course in hospital (n=56)

| | |
|---|-------------------------|
| Mean gestational age, # (range) | 37.0 weeks (30.0-41.0) |
| Admitted to neonatal intensive care, % (n) | 91.1% (51) |
| Demonstrated signs of neonatal abstinence syndrome, % (n) | 48.2% (27) |
| Morphine protocol implemented, % (n) | 92.6% (25) ¹ |
| Mean length of stay, # (range) | 25.3 days (3.0-75.0) |
| Infant discharged to the custody of: | |
| - Parent | 75.0% (42) |
| - Non-parent family member | 5.4% (3) |
| - Foster care | 19.6% (11) |

¹ n=27, proportion of those who developed neonatal abstinence syndrome who were started on morphine

References:

- Indolfi, G., Hierro, L., Dezsofi, A., Johnel, J., Debray, D., Hadsic, N., . . . Fischler, B. (2018, March). Treatment of chronic hepatitis C virus infection in children: a position paper by the hepatology committee of European Society of Paediatric Gastroenterology, Hepatology and Nutrition. *Journal of Paediatric Gastroenterology, Hepatology and Nutrition*, 66, 505-515.
- Ceci O, Margiotta M, Marelllo F, Francavilla R, Loizzi P, Francavilla A, et al. Vertical transmission of hepatitis C virus in a cohort of 2,447 HIV-seronegative pregnant women: a 24-month prospective study. *J Pediatr Gastroenterol Nutr* 2001;33:570-5.
- Schwimmer JB, Balistreri WF. Transmission, natural history, and treatment of hepatitis C virus infection in the pediatric population. *Semin Liver Dis* 2000;20:37-46.
- Squires, J. E., & Balistreri, W. F. (2017). Hepatitis C virus infection in children and adolescents. *Hepatology Communications*, 1(2), 87-98.
- Public Health Agency of Canada. (2018, 06 13). Reported cases from 1991 to 2016 in Canada - Notifiable diseases on-line. Retrieved from <http://dsol-smcd.phac-aspc.gc.ca/notifiable/charts?c=y1>
- Robinson JL, Doucette K. The natural history of hepatitis C virus infection acquired during childhood. *Liver Int* 2012;32:258-70

Discussion

- The pilot project resulted in 38.5% of confirmed high risk infants receiving appropriate HCV screening who would not otherwise.
- The 6.7% vertical transmission is close to the estimated vertical transmission rates found in the literature.
- Previously published studies have noted adequate HCV screening in 17-58% of high risk infants. Our finding of almost 40% being appropriately screened is consistent and in the upper level of this range.
- High proportion of mothers had an unknown HCV status at the time of delivery possibly suggesting an opportunity to screen high risk mothers at the time of delivery in order to ensure appropriate care and screening of both the mother and the infant.
- A significant number of children born previously to these high risk mothers have likely not been screened for HCV indicating a need to implement a formal screening strategy for high risk infants going forward but also a strategy to identify and screen those who required screening but never received it.
- Among this population, contacting caregivers can be problematic due to lack of consistent contact information, and failure to attend appointments is common. It is unknown whether PCPs attempted to have screening completed but encountered barriers related to contacting the caregiver and follow-through with the blood work required for HCV testing.

Conclusions

- In the setting of HCV-positive or unknown status in high risk mothers, babies should be screened as early as possible to minimize barriers to screening.
- If a baby has positive serology, PCR is performed to confirm presence of the virus. Repeat screening at 12-18 months to monitor for viral clearance.
- Persistence of chronic HCV infection in infants carries a high burden of disease and needs to be identified early.
- Education of health care providers and families is important to improve care delivery to those with and at-risk for HCV.
- Commercially available products present an opportunity for alternatives to painful venipuncture and improve parental compliance.



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