State-of-the-Art Paper

Vox Sanguinis

Vox Sang 2000; 78 (suppl 2): 249–252

Hepatitis C Lookback in Canada

Mindy Goldman Anne Long

Héma-Québec, Montreal, Canada

Abstract

Background and Objectives: Since March 1990, all blood donations in Canada are screened by enzyme-linked immunosorbent assay (EIA) for antibodies to HCV, with confirmatory testing done using a recombinant immunoblot assay (RIBA). Because HCV may cause chronic asymptomatic hepatitis, in 1995, the Canadian Red Cross began targeted HCV lookback studies on all confirmed positive donations. These have been continued by the two new operators of the blood system in Canada, Héma-Québec and the Canadian Blood Services. Subsequent to recommendations made in the public inquiry into the Canadian blood system, led by judge Krever, general lookback through letter notification of all patients transfused in the years prior to the introduction of anti-HCV testing was initiated in several pediatric hospitals, and later in several Canadian provinces. **Materials and Methods:** Targeted HCV lookback was done for all donors confirmed positive by RIBA testing from the start of HCV testing in 1990. In 1999, stored RIBA 2 indeterminate samples were re-tested by RIBA 3, and lookback performed on confirmed positive donations. In the province of Quebec, hospitals were surveyed to determine methods and resources involved in lookback. Provinces performing general letter notification entered hospital transfusion records into a central transfusion data bank, and performed linkage with other provincial data banks to remove deceased patients and obtain current addresses. **Results:** As of January 2000, targeted lookback had been completed on 4,859 components of 1,628 anti-HCV positive repeat donors. 2,991 recipients were deceased, and 451 were not found or tested. Of the 1,422 recipients tested, 954 (67%) were anti-HCV positive. Approximately half were already aware of their HCV status. Lookback efforts in hospitals were hampered by lack of resources and manual records. General letter notification in British Columbia (BC) and Prince Edward Island (PEI) led to the testing of 38,960 and 1,953 recipients respectively, with 5.0 and 2.2% of tested recipients found to be anti-HCV positive. **Conclusion:** In completed targeted lookback investigations, 19% of components are eventually linked to an anti-HCV positive recipient. These results are very similar to those obtained in other countries, such as Denmark and the UK. In general letter notification lookbacks, the frequency of anti-HCV in the tested recipients is approximately twice the frequency of the general population.

Introduction

HCV was responsible for the majority of cases of post-transfusion hepatitis prior to the discovery of the viral agent and the development of screening tests. Over 90% of recipients of blood from anti-HCV positive donors become infected with the virus. Because most acute infections are mild or asymptomatic, infected patients may remain undiagnosed for years. However, in the years and decades following transfusion, recipients may develop chronic active hepatitis, cirrhosis, and hepatocellular carcinoma. Lookback, or the identification of recipients of potentially contaminated blood, first began with HIV testing [1]. Targeted or focussed lookback refers to the notification of recipients of blood from donors subsequently found to be positive for the given

KARGER
Fax +41 61 306 12 34
E-Mail karger@karger.ch
www.karger.com

Mindy Goldman, MD
Héma-Québec
4045 Cote-Vertu, St-Laurent (Quebec) Canada H4R 2W7
Tel. GRO-C Fax GRO-C
E-Mail mgoldman@ GRO-C

marker. The transfusion service usually becomes aware that the donor is infected on subsequent testing at the time of repeat donation. Although specific testing for anti-HCV was introduced in Europe and North America in 1990-91, targeted lookback was begun in various countries from 1990 to 1998 [2]. Because of greater knowledge about the long term consequences of infection, the potential benefits of lifestyle modification, and recent advances in treatment, public health authorities and regulatory agencies have increasingly concluded that it is advisable to identify recipients of potentially infectious blood.

Anti-HCV testing was introduced in Canada in March 1990. Surrogate testing using anti-HBc and alinine aminotransferase (ALT) testing was never introduced in Canada. In 1995, the Canadian Red Cross (CRC), which was the sole blood supplier in Canada at the time, began targeted HCV lookback. Lookback was very much a CRC initiative; it was not mandated by the regulator, Health Canada, and in most provinces received no support from public health departments or ministries of health. In 1992, the federal government set up an enquiry into the blood system in Canada, led by judge Krever, to examine the functioning of the blood system in the 1980s and to make recommendations to enhance the safety of the blood supply. Ten of the 43 recommendations of the preliminary report, which appeared in 1995, addressed the subject of lookback [3]. In addition to supporting the ongoing targeted lookback program, the report recommended general letter lookback for hepatitis C for all patients transfused between 1978 and 1990. In the late 1990s, the federal government announced that patients infected by hepatitis C through blood transfusions received between 1986 and 1990, when surrogate testing was done in the US but not in Canada, would receive monetary compensation. Several provinces decided to also offer compensation for patients transfused before 1986. The recommendations of the Krever report, plus the availability of compensation for patients who may have been infected by blood transfusions, led to the implementation of general letter notification campaigns in several hospitals, and later in several provinces.

Materials and Methods

Targeted Lookback

Donor testing: The first generation anti-HCV EIA introduced in March 1990 was replaced in 1992 and 1996 by second and third generation testing respectively (Ortho Diagnostics System, Raritan, NJ). Confirmatory testing was done at the CRC national testing lab until Oct, 1998, and then in the CBS national testing lab and the Québec public health laboratory (LSPQ). RIBA 3.0 testing was done in parallel with RIBA 2.0 testing starting in 1996, and replaced RIBA 2.0 in 1999 (Chiron Corp., Emeryville, CA). Stored sera from donors with indeterminate RIBA 2.0 results were re-tested by RIBA 3.0. Donation records are computerized from 1987, and can usually be manually retraced to 1982. Lookback is also performed on donors found to be anti-HCV positive in the course of traceback investigations of patients potentially infected by transfusions.

Recipient notification: Forms are sent to hospital blood bank consignees with the unit number, type of component, and date of collection and shipping, requesting that recipients be notified and tested for HCV. Forms are sent simultaneously for all previous donations of a confirmed positive donor for which records are available. Blood bank directors are asked to return the completed form, including the recipient's age, diagnosis, and the date and results of HCV testing. Most hospitals perform recipient testing with a second and more recently, third generation EIA. Results may be confirmed by RIBA or an EIA test from a different manufacturer. Additional information about hospital resources and records was obtained from Quebec hospitals by a questionnaire sent to all hospital blood banks in 1997.

General Lookback

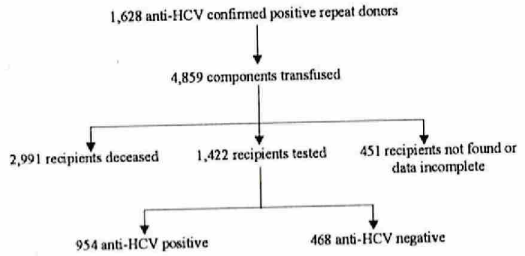
Pediatric hospitals: Several pediatric hospitals performed general letter notification of all patients transfused in various time periods in the late 1970s and 1980s. Current addresses and mortality data were obtained from provincial health ministries via universal public health insurance card databases.

Provincial general lookbacks: In 1996, the British Columbia (B.C.) Ministry of Health, in collaboration with all 84 hospitals in B.C. entered the transfusion records of all recipients of fresh blood components transfused between January 1985 and June 1990 into a central data base. These dates were chosen since at that time hospital records had to be maintained for a period of 10 years. Duplicate patient records were removed. Through a combination of name, date of birth, and provincial health number, records were linked to Vital Statistics data and the public health insurance database to remove deceased recipients and find current addresses. Similar methodology was used by Saskatchewan, Nova Scotia, and Prince Edward Island (PEI) in 1998. Several provinces also included notification for recipients of various fractionation products.

Results

Targeted Lookback

Results of Canadian targeted lookback studies completed by January 1, 2000 are summarized in Figure 1. The anti-HCV seroprevalence rate in Canadian donors decreased from 0.14% in 1990 to 0.02% in 1999. In addition, most repeat donors now found to be seropositive are recent seroconverters rather than chronic HCV carriers, therefore the number of components involved in each lookback investigation has also declined. Sixty-two percent of recipients had died at the time



N.B. Several recipients had received more than 1 component involved in lookback notifications. Combined data from Canadian Blood Services and Héma-Québec.

Fig. 1 Completed Targeted HCV Lookbacks, Canada as of January1/2000

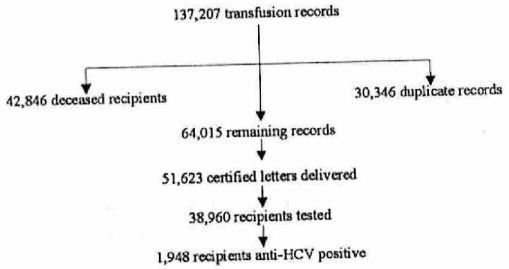


Fig. 2 General HCV Lookbacks, British Columbia, Canada, 1985-1990

of attempted notification. Sixty-six percent of recipients tested were anti-HCV positive. Almost all seropositive recipients had been transfused prior to the introduction of second generation antibody testing in 1992. Data from the province of Quebec (approximately 25% of the Canadian total), demonstrate that 53% of recipients notified from 1995 to 1998 were already aware of their anti-HCV positive status [4]. Recipients of multiple transfusions for coagulopathies or other hematologic illnesses were more likely than surgical patients to have already been tested for HCV. In the pediatric setting, 34% of recipients had died, leading to a higher yield of lookback [5]. The survey of hospitals in the province of Quebec demonstrated considerable variability in the conservation of medical records. According to survey results, we estimate that hospital records exist for 88% of components transfused between 1985 and 1990, and 100% of components transfused after 1990. Even in 1990, 82% of hospitals still had manual transfusion records [4].

General Lookback, Pediatric Hospitals

Preliminary data from 4 hospitals providing tertiary care in pediatrics that performed general letter lookback demonstrates that from 53 to 71% of letters sent were delivered [2]. Approximately 3% of tested recipients were anti-HCV positive. In the study from the Hospital for Sick Children in Toronto, PCR testing was also done in anti-HCV positive recipients (n=67); 45 (67%) of children tested were PCR positive [6].

General Lookback, Canadian Provinces

Results of general lookback in the province of B.C. and summarized in Figure 2 [7]. Three percent of transfusion records were eventually linked to an anti-HCV positive recipient. The estimated cost of the program was at 1.3 million US dollars, or 667 US dollars per case of HCV, including laboratory testing, but omitting physician visits. It is not clear how many of these recipients were already aware of their HCV status. In P.E.I., 2.2% of tested recipients were found to be anti-HCV positive. 58% of these had undergone testing before general lookback notification. HCV-positive recipients were more likely to have received multiple transfusions. Notification costs were estimated at 15,000 US dollars per newly diagnosed HCV case [8].

Discussion

Affecting approximately 1% to 2% of the population, HCV is the most common chronic blood-borne infection in the US and a major public health problem in North America and Europe. Because transfusion before 1990 is estimated to account for less than 10% of prevalent HCV infections, lookback studies alone are an ineffective public health strategy [9].

Many countries have undertaken targeted lookback studies for HCV [9-15]. From 1 to 19% of components are eventually traced to an HCV positive recipient. In Canada, it is estimated that this approach will result in the identification of 15% to 20% of surviving HCV-positive recipients. Incomplete record keeping and manual records are major obstacles in performing targeted lookback, and illustrate the necessity of vein to vein tracking and computerization of blood bank records. The fact that 60% of HCV-positive recipients identified by targeted lookback or general letter notification have already been tested for HCV suggests that education of physicians and patients may result in the testing of a large numbers of transfusion recipients. However, particularly in the pediatric setting, many patients are unaware that they have been transfused. Certain hospitals now issue patients a card on hospital discharge stating that they have been transfused. Because general letter HCV lookback starts with all recipients records rather than returning donors, it results in the identification of a greater proportion of surviving HCV-positive recipients. However, it is a major public health initiative, and requires cooperation between hospitals and various government agencies. These programs have demonstrated the utility of a permanent, centralized registry of blood product recipients, with links to other data bases.

Several Canadian provinces are working on developing centralized registries as part of hemovigilance.

Acknowledgments

We would like to acknowledge Lindsay Patterson and Dr. Graham Sher for providing results from the Canadian Blood Services, and Lise Drapeau for secretarial assistance.

References

1 American Association of Blood Banks: Lookback: Joint Statement of the American Association of Blood Banks, American Red Cross, and Council of Community Blood Centers. Bethesda, MD, AABB 1986
2 Goldman M, Juodvalkis S, Gill P, Spurll G: Hepatitis C Lookback. Transfusion Medicine Reviews 1998;12:84-93
3 Minister of Public Works and Government Services: Preliminary Report from the Commission of Inquiry on the Blood System in Canada. Toronto, Canada, Minister of Public Works and Government Services 1995
4 Long A, Spurll G, Demers H, Goldman M: Targeted hepatitis C lookback: Quebec, Canada. Transfusion 1999;39:194-200
5 Lapointe H, Hume H: Hepatitis C Lookback in a Pediatric Setting. Canadian Society for Transfusion Medicine Annual Meeting, Quebec City May 2000
6 Roberts EA, King SM, Fearson M, McGee N: Hepatitis C in children after transfusion: assessment by look-back studies. Acta Gastro-Enterologica Belgica 1998;61:195-7
7 Report of the Standing Industry Advisory Group on Blood Issues: Final Report. British Columbia Ministry of Health and Ministry Responsible for Seniors May 23, 1996
8 Van Til L, Sweet LE: Blood recipient notification for hepatitis C in Prince Edward Island. CMAJ 2000;162(2):199-202
9 Alter MJ: Hepatitis C virus infection in the United States. J of Hepatology 1999;31(Suppl 1):88-91
10 Vrielink H, van der Poel CL, Reesink HW, et al: Look-back study of infectivity of anti-HCV ELISA-positive blood components. Lancet 1995;345:95-96
11 Morris K, Bharucha C: Completed hepatitis C Lookback in Northern Ireland. Transfusion Medicine 1997;7:269-275
12 Christensen PB, Gronback K, Krarup HB: Transfusion-acquired hepatitis C: the Danish lookback experience. Danish HCV Lookback Group. Transfusion 1999;39:188-193
13 Bullen C: Report to the Ministry of Health on the New Zealand National Hepatitis C Lookback Programme. Wellington, New Zealand, New Zealand Ministry of Health, 1994-1996
14 Dike AE, Christie JML, Kurtz JB, Teo CG: Hepatitis C in blood transfusion recipients identified at the Oxford Blood Centre in the national HCV look-back programme. Transfusion Medicine 1998;8:87-95
15 O'Riordan JM, Conroy A, Nourse C et al: Risk of hepatitis C infection in neonates transfused with blood from donors infected with hepatitis C. Transfusion Medicine 1998;8:303-8