Background

Hepatitis C in France in the 1990s

• Since the mid 1990s:
  - risk of hepatitis C transmission by transfusion very low
  - End of the 1990s:
    - prevalence of declared anti-HCV antibodies in drug users: 58%
    - reports of episodes of transmission related to various medical procedures
      - hemodialysis
      - misuse of finger-stick devices for blood-glucose monitoring
      - multiple d pose vials used for anesthesia
    - endoscopy
  - National program for the prevention and control of hepatitis B and C
  - National surveillance system to monitor changes in epidemiological and clinical characteristics of HCV patients at first referral in 26 hepatitis reference centres, implemented in 2000

Objectives

• To identify HCV infection modes of transmission that persist since the screening of blood donors with 3rd generation HCV antibody assays (1994)
  - incident case-control study
  - cases : HCV seroconverters

Methods

Design so far:

- mostly prevalent case-control or cross sectional studies
- or with exclusion of subjects that had been transfused or had been IV drug users

- incident case-control study

- cases : HCV seroconverters

Cases and source populations

- Case definition: a person with a documented negative HCV antibody test (3rd generation) reported from 1995
- followed by a subsequent positive test between 1998 and 2001

Exclusion criteria

- case recognized through follow up of a risk factor
- last negative antibody test of 1st or 2nd generation

Two source populations

- known blood donors (tested at each donation) cases between 1998-2001
- patients referred to hepatology reference centres: cases referred in 2000 & 2001 and included in the hepatitis C surveillance system

Controls

- One to four controls per case-patient
- Same population source as the case-patient
- known blood donors obtained randomly from centre donors list

Community controls for cases identified in hepatology referral centres selected by random digit dialing of the area of residence of the case

Matched on age group (+/- 10 years), gender

Data collection

- Standardized questionnaire on established and potential risk factors
  - Period of exposure investigated
    - case-patient: 3 months before the date of last negative to
      the date of first positive HCV serology
    - matched controls: same period as the case.
  - Blood donors
    - face to face interview with same interviewer for the case and matched controls.
  - Patients newly referred to hepatology reference centres
    - phone interview of cases and matched controls by InVS interviewers.

Multivariate analysis

- Drug use
  - no discordant pairs where the case is not exposed and at least one control is exposed
  - multivariate analysis with conditional logistic regression not possible
  - model fitted with unconditional logistic regression, adjusted on matching criteria

- Colinearity
  - IDU sexual partner, HCV+ sexual partner were not entered in the model because
    - they were colinear two by two and with the variable « drug use »
    - and also because of the large number of missing data for those variables

Results

**Cases and matched controls by community HCV risk factors:** univariate analysis

<table>
<thead>
<tr>
<th>Exposures*</th>
<th>cases 64</th>
<th>controls 227</th>
<th>OR* (95% CI)</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV drug use</td>
<td>11 (17.2)</td>
<td>1 (0.4)</td>
<td>1 -0.0001</td>
<td></td>
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<tr>
<td>IV drug use</td>
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<tr>
<td>Tattooing/piercing</td>
<td>8 (12.5)</td>
<td>8 (3.5)</td>
<td>8.8 (1.7-44.1)</td>
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</tr>
<tr>
<td>Mean of sexual partners</td>
<td>1.25</td>
<td>1.13</td>
<td>1.1* (0.8-1.5)</td>
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</tr>
</tbody>
</table>

Methods

- Colinearity: IDU sexual partner, HCV+ sexual partner were not entered in the model because they were colinear two by two and with the variable ‘drug use’.

Cases and matched controls by mechanical medical procedures: univariate analysis

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**Multivariate analysis**

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<th>Adjusted OR (95% CI)</th>
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</thead>
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<tr>
<td>Drug use</td>
<td>9 (11.7-101.5)</td>
<td>109 (7.7-1584.8)</td>
</tr>
<tr>
<td>Tattooing/piercing</td>
<td>8.8 (1.7-44.1)</td>
<td>2.8 (0.7-10.7)</td>
</tr>
<tr>
<td>Digestive endoscopy</td>
<td>8.0 (2.3-27.2)</td>
<td>5.7 (1.4-23.8)</td>
</tr>
<tr>
<td>Invasive radiology</td>
<td>9.2 (1.6-54.4)</td>
<td>11.6 (1.7-75.8)</td>
</tr>
<tr>
<td>General anaesthesia</td>
<td>5.6 (2.2-14.7)</td>
<td>2.5 (0.8-7.8)</td>
</tr>
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</table>

Discussion/limitations

- Limited sample size
- The characteristics of our study populations may limit the extrapolation of results to general population.
- Potential for “social desirability bias” = ie drug use: leading to an underestimation of drug use but not necessarily differential ie related to the HCV status.
- Cases not included were younger, a majority of men: possible underestimation of the role of drug use.

Conclusions

- This incident case-control study provides exploratory information on HCV transmission in France between 1995 and 2001
- As expected, IV drug use appears to play a major role
- Many potential or suggested transmission modes: such as dental care, tattooing, piercing... do not seem to have had any determining epidemiological role over the last years
- Invasive medical acts: remained a potential source of new HCV infection, however their contribution in terms of number of new infections remains limited

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