Nosocomial HCV infections

Anne Carbonne

Regional center for nosocomial infection control, Paris
HCV transmission in health care settings

Blood exposure

Patient 1

or

Invasive procedure

Health care worker

Patient 2
Patient to patient HCV transmission

- Haemodialysis (Malavaux 1999; Delarocque 2002)
- Digestive endoscopy (Bronowicki 1997)
- Diabetic children (Desenclos 1998)
- Anesthesiology (Thallis 2003)
- transplantation (Pereira 1992)
- Surgery (Heisen 2000)
Patient to patient transmission mechanism

- Most unknown
- Shared injection material
- Shared injection products
- Breaks in barrier precautions
- Breaks in material disinfecting
Transmission from a health care worker (HCW) to patients

- Orthopaedic Surgery (Ross 2002)
- Cardiothoracic Surgery (Esteban 1996)
- Gynaecology (PHLS 1999, Ross 2002)
- Anaesthesiology (Ross 2000)
HCW to patient transmission mechanism

- Percutaneous injury
- Shared injection material with patients
Notifications of nosocomial HCV infection

- 13 notifications since 2001
- 18 hospital acquired cases
- 9 through anaesthesia
- 4 hemodialysis patients
- 1 hepatic transplantation
- 1 in invasive radiology
- 1 shared finger stick device
- 2 unknown mechanisms
Outbreak identification

• In November 2001, a 35-year old woman was examined for acute hepatitis C
• She underwent orthopedic surgery 2 months before in a private clinic
• In December 2001, the case was notified at the regional center for NIC and health authority
• An investigation was launched at the clinic to screen patients operated on the same session for HCV
Epidemiological investigation (1)

*Description of the cluster*

• Of 5 patients operated on the same session, 4 were HCV⊕ 3 months later (n°1, 2, 4, 5)
• Patient n°2 was the notified case
• Patient n°1 had unknown chronic hepatitis C (tattoo 3 years before) => probable source-patient
## Epidemiological investigation

### Description of patients characteristics

<table>
<thead>
<tr>
<th>Patients</th>
<th>N°1</th>
<th>N°2</th>
<th>N°3</th>
<th>N°4</th>
<th>N°5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>44</td>
<td>36</td>
<td>29</td>
<td>26</td>
<td>78</td>
</tr>
<tr>
<td><strong>Sexe</strong></td>
<td>M</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td><strong>Procedures</strong></td>
<td>Osteosynthesis</td>
<td>Synoviectomy</td>
<td>Ingrowing Nail</td>
<td>Verruca</td>
<td>Skin graft</td>
</tr>
<tr>
<td><strong>General anesthesia IV</strong></td>
<td>Fentanyl</td>
<td>Fentanyl</td>
<td>0</td>
<td>Fentanyl</td>
<td>Fentanyl</td>
</tr>
<tr>
<td>VHC serostatus</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>
Epidemiological investigation (2)

Search for the source of contamination

- None received blood or blood products
- No common surgical material
- Staff members = HCV Θ
- All HCV positive patients (N°1, 2, 4 and 5) received general anesthetic injections of the same multidose vial of Fentanyl®
- Patient n°3 = HCV Θ
Partition of fentanyl vial between the 4 patients

<table>
<thead>
<tr>
<th>vial 1</th>
<th>vial 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(500µg)</td>
<td>(500µg)</td>
</tr>
<tr>
<td>150µg</td>
<td>100µg</td>
</tr>
<tr>
<td>150µg</td>
<td>100µg</td>
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<td>100µg</td>
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<td>100µg</td>
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</tbody>
</table>

**Material 1**

SAME INJECTION MATERIAL USED FOR:
- 4 collecting product in vial 1
- 2 collecting product in vial 2
- 6 injections for patient 1

**Patient 1**

HCV ⊕

- 2 HCV ⊕
- 3 HCV Θ
- 4 HCV ⊕
- 5 HCV ⊕
Immediate control measures

• Stop reusing disposable needles syringes
• Use monodose vials of fentanyl®
• No reuse multidose vials
• Use peripheral venous catheters with anti-reflux system
Phylogenetic analysis

Serum were sent to the viral hepatitis national reference center for phylogenetic analysis and comparison.

Patients #1, 2, 4 and 5 were infected with genotype 1b.

Molecular characterization of HCV showed close homology between the 4 viruses.
Information and screening campaign

• To professional
  - Recommendations for practices via website/internet
  - ***National Agency for security of health products was required to propose advises for multidose fentanyl and other anesthetic products

• To exposed patients:
  - media-based information
  - personnel mailing: explanation of the problem and recommendation for HCV screening
Screening of exposed patients

• Retrospective cohort of 1086 patients from 1997 to 2001.
• 796 patients tested for VHC who returned the results: 7 HCV positive patients

☑ No cluster of HVC positive patients
Conclusion

• Healthcare related HCV infections are now better described.

• Despite recommendations, breaches in medical practices are associated with HCV transmission.

• Control efforts of blood born virus infection are needed based on experts steering groups.