



## NOSOCOMIAL HEPATITIS C: A CRYPTIC SOURCE FOR A CRYPTIC DISEASE

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### BACKGROUND

Hepatitis C is the most commonly diagnosed bloodborne pathogen in the United States. Approximately 3.2 million people in the United States are infected with hepatitis C and 75-85% of them will develop long-term complications, which may include cirrhosis, liver failure, and liver cancer.<sup>1</sup> Most people will have no symptoms at the time of initial infection and their complications may only appear 20-30 years after initial infection. The majority of people who currently have chronic hepatitis C are thought to have acquired their infection in the 1970s and 1980s due to blood transfusions or sharing needles during injection drug use, though rarely the infection may also be acquired via sex or during the perinatal period.

A test to detect hepatitis C antibodies was developed in the early 1990s, leading to a sharp reduction in transfusion related cases of hepatitis C. Since the 1990s, most new infections with hepatitis C are thought to be due to sharing needles for illicit injection drug use. However, there has been an increasing awareness of hepatitis C acquired due to healthcare exposure (often referred to as “nosocomial” hepatitis C). These infections have been associated with contaminated multi-use medication vials, re-use of medication syringes, or infection control breaches in hemodialysis centers.<sup>2</sup>

Determining the source of infection with hepatitis C can be very challenging for a variety of reasons. As stated above, most people do not have symptoms at the time of initial infection and may not know that they have been infected with hepatitis C until they develop liver failure. In this case, it is almost impossible to determine when and where they were exposed to the virus in the preceding years or decades. It is also hard to distinguish the acute onset of a new hepatitis C infection from a clinical flare of a longstanding infection; there is no single laboratory test that can distinguish acute hepatitis C from chronic hepatitis C. Both acute and chronic infection may present with abdominal pain, nausea, vomiting, diarrhea, jaundice, fatigue, fever, elevated liver function tests and serological evidence of hepatitis C. Therefore, unless a person has documentation of a negative hepatitis C test in the past, it is almost impossible to know if a patient with newly diagnosed hepatitis C has a newly acquired infection or a clinical flare of a previously acquired infection. The Council of State and Territorial Epidemiologists (CSTE) defines a case of acute hepatitis C as someone who has a discrete onset of clinical symptoms, has jaundice or highly elevated levels of specific liver function tests, and one or more specific blood tests positive for hepatitis C. Of the approximately 20,000 positive serological results reported each year to the Los Angeles County (LAC) Department of Public Health (DPH), only 3-8 each year are ultimately identified as acute hepatitis C cases.

Since mid-2007 staff at the LAC DPH Acute Communicable Disease Control Program (ACDC) have routinely interviewed patients with documented acute hepatitis C to identify any nosocomial sources for their infection. Despite careful re-interviewing, unambiguous cases of nosocomial hepatitis C are rarely identified. However, of ten acute cases of hepatitis C reported to ACDC in 2009, five had traditional risk factors for hepatitis C, including IV drug use and sex with an infected partner, but five appeared to have only nosocomial healthcare exposure. In the spring of 2009, a patient was reported who newly seroconverted to hepatitis C in 2008 after being negative for hepatitis C for many years. In the summer and fall of 2009, four unrelated cases of acute hepatitis C were reported to ACDC; all the cases had significant healthcare exposures in the six months before the onset of their disease (the incubation period of hepatitis C is two weeks to six months) and no other “traditional” risk factors for hepatitis C such as drug use or sex with an infected partner. All five cases had been reported by physicians or the patients who believed that they acquired hepatitis C from a specific healthcare source or medical procedure. Therefore, ACDC conducted detailed investigations of each of the cases. The goal was to determine the patients’ source(s) of infection and to rectify any infection control breaches that may have resulted in the transmission of this infection.



## METHODS

Medical records were reviewed and a careful medical history was obtained from all the cases. A list of medical procedures and where they were performed during the incubation period for each of the patients was obtained. ACDC contacted medical facilities and obtained the names and birthdates of the patients who preceded and followed the index patients for these discrete procedures and cross referenced those names to the LAC DPH hepatitis registry to identify previously reported hepatitis C cases from whom transmission of hepatitis C from patient to patient may have occurred at these facilities. Site visits were made to selected facilities where high risk medical procedures were performed. Diagnostic and infection control procedures were observed; records were reviewed, and personnel were questioned about infection control procedures at the facilities. All facilities where a site visit was conducted received a follow-up letter which detailed any significant findings and provided recommendations for improving infection control or public health practice.

## RESULTS

All patients had multiple healthcare exposures during their incubation period that could have been a source of their infection. Medical procedures identified included surgery, cystoscopy, colonoscopy, radiological scans with injected contrast, receipt of intravenous fluids and nutrients, dental procedures, intramuscular and subcutaneous injections, and routine blood draws. Of note, no case had overlapping healthcare exposures with any other case. No other patients with hepatitis C who either preceded or followed the index patients were identified in the hepatitis registry.

Site visits were made to a free-standing surgical center, two free-standing physician's offices that operated medical spas, and two facilities associated with large hospitals where outpatient procedures are performed. Very little evidence of significant breaks in infection control was found in the facilities that were regulated (surgical center, those associated with large hospitals). The facilities were clean and well operated, had documented infection control policies, and provided ongoing education for personnel.

In contrast, inspections made at the free-standing physician's offices revealed several breaches in standard infection control procedures including using single-dose vials for multiple patients, not labeling or ensuring proper discarding of multi-dose vials, and using single syringe-needle combinations to serially enter several multi-dose vials. All of these practices can result in cross-contamination. Furthermore, both facilities lacked on-site written procedures for aseptic medication administration and medication storage, proper policies for infection control, and guidelines for employee exposures to bloodborne pathogens. Both offices also lacked duty statements for their medical assistants. This is important because the State of California clearly regulates what procedures medical assistants may or may not do.<sup>3</sup> These physicians were provided with detailed letters documenting deficiencies and providing recommendations to meet infection control standards consistent published CDC recommendations.

## CONCLUSIONS

Investigation results did not identify any single healthcare exposure as a cause of acute hepatitis C in the five patients that were reported to ACDC in 2009. There are several reasons for this: 1) The cases may have been chronic cases that had been infected with the disease years ago and just now are presenting with symptoms; in that case investigating healthcare exposures that took place only six months before their onset of symptoms would not be sufficient to identify a source, 2) These are acute cases that are due to healthcare exposure but the infection control breaches were so rare that no one else became ill or others who become ill have not been reported to ACDC, and 3) These are acute cases but the case has another unreported risk factor for acquiring hepatitis C.

Each of the investigations was painstaking, requiring multiple interviews, chart reviews, obtaining other patients' names and birthdates, reviewing hepatitis registries, lengthy and comprehensive site visits to facilities, and follow-up to site visits. Infection control breaches at some individual physician's offices were identified and improved practices were implemented at these offices, none of the breaches was sufficient to recommend immediate cessation of activities. Based on the experience with these cases, ACDC has



changed its protocol for investigating cases of acute hepatitis C. ACDC will continue to interview patients extensively for possible healthcare exposures. ACDC will document all such medical procedures in a database to detect common events; a site visit to the facility will be made only if another patient states the same medical procedure at the same facility, similar to the algorithm used by New York State to investigate cases of nosocomial hepatitis C.<sup>4</sup> This protocol balances dwindling public health resources with the likelihood of identifying and stopping a source of ongoing hepatitis transmission.

Though a source for these individual cases of hepatitis C was not determined, it was clear that there were breaches in infection control that occurred in the private physician's offices. Such offices are not regulated by any authority other than the California Medical Board and there are few, if any, infection control standards that have been specifically written for this population. Currently there are no regularly scheduled inspections or licensing exams of the offices of individual physicians. Multiple outbreaks investigated by LAC DPH and other public health agencies have documented poor infection control and lack of oversight in private offices leading to a variety of nosocomial infections.<sup>5,6</sup> Better oversight and education of physicians may decrease exposure to hepatitis C and other pathogens.

## REFERENCES

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<sup>6</sup> English L, Terashita D, Burwell L. Outpatient medical procedures and patient safety: Who's minding the store? *Acute Communicable Disease Control Program Special Reports 2007.*

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