Inform'ACTION
AUGUST 2002

Shigella flexneri bloody mucoid diarrhoea outbreak on the island of Futuna

In May 2002, a fairly large epidemic of bloody mucoid diarrhoea broke out on Futuna, putting the EpiNet Team for the Territory of Wallis and Futuna on alert for the very first time. This outbreak, whose total number of suspected cases reached nearly 800 in late June 2002, affected some 16% of Futuna's population. It was the first time in several years that the island of Futuna was so hard hit by an acute diarrhoea outbreak. The outbreak gave us an opportunity to note not only the imperfections in our surveillance system but also how useful it is for a territory like Wallis and Futuna to have access to an EpiNet team and the support of a regional outbreak and response agency.

Traditionally, the months of April, May and June are rich in religious festivals which give rise to a large number of gatherings and custom meals open to all. In addition to these festivals, this year there were political meetings for the French legislative and presidential elections. What's more, the weeks preceding this outbreak were particularly humid. The first cases of bloody mucoid diarrhoea accompanied by fever were seen during exams at the hospital on Futuna on 29 April 2002 — that is, 24 hours after the Festival of St Pierre Chanel which brought a large part of the community together at the Poi Basilica (where St Pierre Chanel's sepulchre is located). Over the following week, about 100 suspected cases were recorded. As Futuna's Kaleveleve Hospital does not have a laboratory capable of properly handling stool samples, doctors did not request any faecal cultures or parasite tests during the first week. The blood tests which were sent to the laboratory at Sia Hospital on Wallis basically showed increased C-reactive protein levels of 150 mg/l accompanied by leukocytosis. The large majority of cases came from Taoa and Ono, two villages in the Kingdom of Alo.

At the end of the following week, given the rapid increase in the number of cases following the Ascension holiday and the pilgrimage in honour of the relics of St Theresa, Futuna's EpiNet member Dr Gwenael Roualen contacted me by telephone to explain the situation. It was then decided to send a few bloody mucoid stool samples to Wallis to try to identify the causal agent. At first, the parasite tests on three of the five stool samples proved positive for *Entamoeba histolytica* cysts without any vegetative forms of *Entamoeba histolytica histolytica*, but the next day the bacteriological culture revealed the presence of *Shigella flexneri* in all five samples. A study on the pathogen's sensitivity to antibiotics revealed the presence of a penicillinase which rendered the use of amoxicilline ineffective. As Bactrium proved to be active, it was chosen as the preferred treatment. Nearly 300 suspected cases had been recorded by then and the outbreak was no longer confined to two villages but had spread throughout the island.

So, three weeks into the epidemic, I went to Futuna, both to confirm the presence of *Shigella flexneri*, as this pathogen does not support a prolonged stay in the stools due to acidification, and to set up, with Dr Roualen's help, an investigation, which, at that stage, would largely be retrospective. The coprocultures conducted on site once again revealed the presence of *Shigella flexneri*, and the antibiotic sensitivity study

© Copyright SPC 2002

still showed a resistance to amoxicilline and a sensitivity to both Bactrium and fluoroquinolones. However, for economic reasons, Bactrium remained the first-choice treatment.

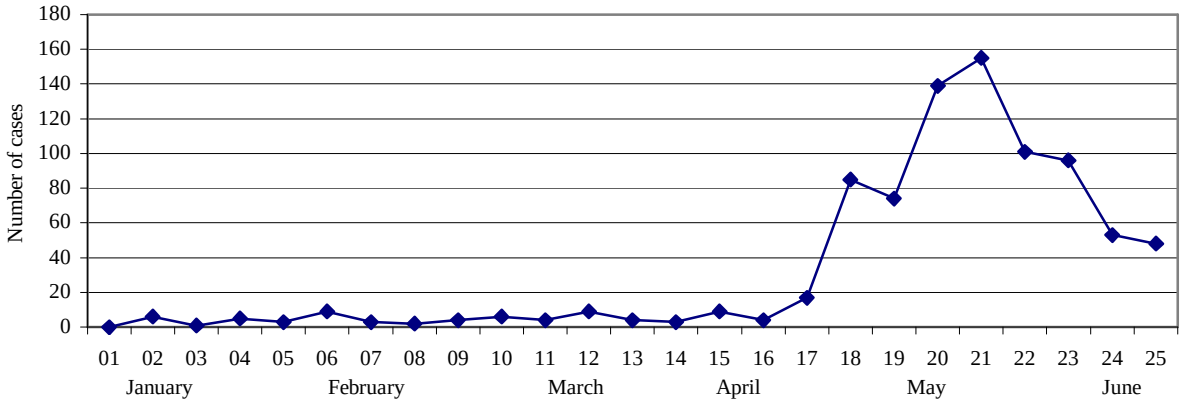
Given the size of the outbreak, which by late May had affected some 10% of the total population and was causing our Bactrium stocks to diminish rapidly, we contacted Dr Tom Kiedrzynski to get some advice on how to set up an epidemiological investigation. Since there is no access to Internet on Futuna at the present time, we asked him to conduct bibliographical research on treating bloody mucoid diarrhoea with fluoroquinolones so as to find an alternative treatment in case the Bactrium supplies ran out.

A report highlighting the basic food hygiene measures to be followed was televised to raise awareness in the community.

For the epidemiological investigation, we worked with the core health team at Futuna's Kaleveleve Hospital on reviewing all the cases of diarrhoea which had been seen during hospital visits since the beginning of the year, in order to be able to confirm the epidemic and present a possible transmission scenario (see figure 1). Given the Prevention and Hygiene Services's limited human resources and infrastructure, we had to decide against a 'case control' study and simply opted for weekly surveillance of the outbreak's evolution. The outbreak slowly decreased in size in June but there were still a few recontamination peaks.

As at 23 June, a total of 754 suspected cases has been recorded, 34 people had been hospitalised (including 11 children under the age of 10 and 11 adults over the age of 60). There were no deaths. A retrospective study involving questioning all the patients so as to classify the cases as either suspected (diarrhoea) or probable (bloody mucoid diarrhoea) is now under way.

Figure 1: Weekly record of cases of diarrhoea on Futuna



© Copyright SPC 2002

In conclusion, the absence in the Territory of any surveillance based on weekly reports from all medical care facilities which would then be submitted to a central location kept us from getting any early warning of a rise in the number of cases involving bloody mucoid diarrhoea with fever, and we only learned about the outbreak at the end of the second week from the EpiNet team member physician. On the other hand, the responsiveness of the EpiNet Team, once the causal agent had been identified, and the regional support given by the SPC's Public Health Surveillance and Communicable Diseases Control Section made it possible to:

- recommend that Bactrium be used as the treatment of choice and to plan an alternative treatment if stocks should run out;
- implement daily monitoring[1] of cases of diarrhoea;
- raise awareness in the community through use of the media.

Isolating Shigella under everyday working conditions at the Wallis and Futuna laboratory

Under normal working conditions, the Health Agency isolates Shigella using a Hektoen culture medium. Suspicious colonies are, then, lactose (-) — that is, green, bluish or clear without a black centre. For suspicious colonies, we test for cytochrome oxidase using the disk sensitivity method, for urease with a urea-indole broth, a fresh stool exam for mobility (Shigella are oxidase (-), urea (-) and immobile). Once those various characteristics have been identified, we conduct a biochemical identification test and re-isolation on a lactose agar with bromocresol purple. The next day, if the existence of Shigella is confirmed (LDC (-) and absence of glucose gas), the Shigella are serotyped using Shigella agglutinating anti-serums (Bio Rad,) and an antibiogram is seeded. Penicillinase research is also conducted using the Cefinase disk method so as to determine the best treatment.

The experience we gained during this outbreak led us to note the following points:

- The imbalance in faecal flora, demonstrated by the Gram stain, was relative stable but not as clearly as described in the literature; on average: 80% Gram (-) bacteria; 10% Gram (+) bacteria and 10% Gram (+) cocci.

- Suspicious colonies were not dominant on the culture media, but this was probably due to the delays in sending the stool samples (Shigella is sensitive to stool acidification).

1. In order to monitor a bacillary dysentery outbreak and theorise on possible transmission modes, daily monitoring (as in Figure 2) is the most appropriate approach, given the short incubation time for bacillary dysentery in general, i.e. 1 to 3 days.

© Copyright SPC 2002

- Two types of selective media were used. At first, we used Hektoen media on which Shigella flexneri colonies did indeed appear dark green. As we ran out of Hektoen media we then had to use SS culture media (which we normally use to test for Salmonella after enrichment). On the SS media, Shigella colonies (theoretically clear with no back centre) were much more difficult to see, and if we had not suspected a *Shigella flexneri* outbreak, we might have had a lot more difficulty in discovering the germ.

- The profiles from the biochemical identification tests associated with the Shigella agglutinating anti-serums made it possible to get a positive identification.

- Finally, the first stool samples analysed were sent to us more than 24 hours after collection, so it was not easy to prove the existence of *Shigella flexneri*. However, as 'bloody mucoid stools are always pathological', we persevered in testing for the causal agent and were finally able to identify the germ responsible for the outbreak.

Dr. Jean-François Yvon
Biologist
Wallis and Futuna Health Agency

© Copyright SPC 2002