Re-emergence of urinary schistosomiasis in Europe ? Infections acquired in Southern Corsica – Investigation of a cluster of *Schistosoma haematobium* infections in 2014

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Introduction

Genitourinary schistosomiasis or bilharzia is an endemic disease found in Africa, Madagascar and the Middle East caused by *Schistosoma haematobium* [1]. **Evidence of re-emergence in Europe has been detected.**

In April 2014, a cluster of cases of genitourinary schistosomiasis was reported among French and German tourists linked to exposure to the Cavu River, in Southern Corsica (figure 1), between 2011 and 2013 [2;3].
Presence of *Bulinus truncatus* snails, the intermediate hosts for *S. haematobium* was confirmed in the Cavu River [4].

On June 16, 2014, The French Public Health Authorities issued a national and European alert recommending screening of persons exposed to water in the Cavu, and the prohibition of bathing in the Cavu River.

Objectives

- To describe the extent of the outbreak and identify potential sites of genitourinary schistosomiasis transmission in Corsica.
- To assess the compliance with the screening recommendations for people exposed to the Cavu River.

Methods

National screening of people exposed to the Cavu river
The French Public Health Authorities informed physicians and laboratories about the outbreak and requested to screen all people exposed to the Cavu River between June 1st and September 30th in 2011 to 2013, irrespective of symptoms. The Regional Health Authority of Corsica organised the screening of workers occupationally exposed to the Cavu River.

The French High Council for Public health (HCSP) recommended the following for screening:
- the combination of two non-operator-dependent first line serological tests: ELISA and Indirect Hemagglutination Assay (IHA) ;
- a validation of positive first-line serology by Western Blot (Schistosoma WB IgG; LDBIO Diagnostics, Lyon, France) ;
- a diagnostic work-up of patients with positive serology test including parasitological examination of urine.

Surveillance of autochthonous genitourinary schistosomiasis
As *S. haematobium* infection was not a notifiable disease, physicians were asked to report all patients with ≥ 1 positive serological test to the health authorities of their region of residence.

Cases were defined as a French resident with laboratory evidence of *S. haematobium* infection and no history of contacts with fresh water in known endemic areas (table 1).
We interviewed physicians and their patients using a questionnaire to explore diagnosis, clinical presentation and exposure to fresh water of cases.
We contacted the parasitology laboratories of French university hospitals for active case-finding.

Table 1 Laboratory criteria for case definition of autochthonous schistosomiasis

Case definition	Laboratory criteria
Possible case	Isolated positive serological screening test (ELISA, IFT, IHA) OR 2 discordant screening serological tests
Probable case	2 positive serological screening tests using different technique OR A positive serological test and a positive Western blot test
Confirmed case	*S. haematobium* eggs by urine examination or histological examination of a biopsy

Rapid assessment of compliance with national screening recommendations
We collected the serodiagnostic data of two major French private laboratories who perform anti-schistosome serology testing for private laboratories throughout France from 2010.

Environmental investigation
20 streams in Corsica were investigated for presence of the intermediate snail host. Collected specimens were tested for *S. haematobium* infestation.

Results

Surveillance of autochthonous genitourinary schistosomiasis
From April 2014 to July 2015:
- 128 cases were notified to The French Regional Public Health Authorities ;
- **103 cases were included (25 cases did not match the case definition), 32 were classified as confirmed cases, 59 as probable cases and 12 as possible cases ;**
- most of the cases were asymptomatic (65%) ;
- none of the 28 workers occupationally exposed to fresh water throughout Corsica tested positive for anti-schistosome antibody or parasite eggs in urine.

Table 2 Summary description of demographics, clinical presentation and exposure of autochthonous schistosomiasis cases, France

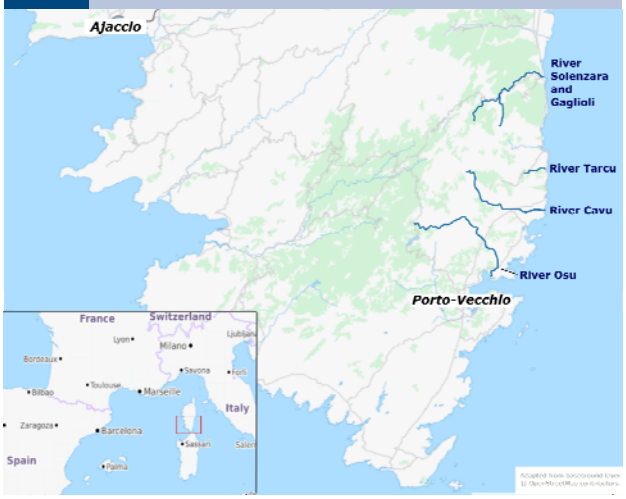
	Total (N=103)	Possible case (N=12)	Probable case (N=59)	Confirmed case (N=32)
Male gender (%)	56.7%	41.7%	56.7%	62.5%
Median age (years)	17	19	17	15
Presence of symptoms of schistosomiasis (%)	35%	33.3%	17.5%	67.7%
Gross hematuria (%)	19%	8.3%.	3.5%	51.6%
Miscroscopic hematuria (%)	32,8%	0%	6,5%	75%
Eosinophilia >500/µL (%)	11,4%	0%	9,7%	17,9%
Year of exposure to the Cavu River				
2014	7.8%	8.3%	10.2%	3.1%
2013	100%	100%	100%	100%
2012 and before	35.7%	50%	34.6%	32.3%

Rapid assessment of compliance with national screening recommendations
Over 37,000 individual serological tests were conducted in 2014 *versus* 5,000-7,000 per year during 2011-2013.

Compared to the expected number of WB positive cases in a post-screening period of 41 weeks, we estimated an excess of 16% cases (n=187, CI95% [95 ; 279]).

Environmental investigation
3,534 *Bulinus* snails were collected in the Cavu River in summer 2014 and **none of them were found to be infected.**
Bulinus snails were found in three other rivers: Solenzara, Osu and Tarcu Rivers (figure 1)[1].

Figure 1 Map of southern Corsica locating rivers with presence of *Bulinus* snails



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Discussion

Surveillance of autochthonous schistosomiasis following the 2014 alert indicates that a limited focus of transmission of *S. haematobium* occurred in the Cavu River in 2013.

Compliance with screening for exposed persons was good (>30,000 tested persons) as was the notification of cases to the health authorities.

After over one year of surveillance, no notified case has brought forth epidemiological data supported by robust laboratory evidence to reveal a resumed transmission in 2014 or a new transmission site.

Monitoring should be continued in all areas receptive to schistosomiasis (where the intermediate hosts are present) throughout Mediterranean Europe in order to detect new foci and guide necessary control measures.

References
[1] European Centre for Disease Prevention and Control. Rapid risk assessment: Local transmission of *Schistosoma haematobium* in Corsica, France. First update - 23 July 2015. Stockholm: ECDC; 2015.
[2] Berry A, Moné H, Iriart X, Mouahid G, Abbo O, Boissier J, *et al. Schistosomiasis haematobium*, Corsica, France [letter]. Emerg Infect Dis [Internet]. 2014 Sep [date cited].
[3] Holtfreter MC, Moné H, Müller-Stöver I, Mouahid G, Richter J. *Schistosoma haematobium* infections acquired in Corsica, France, August 2013. Euro Surveill. 2014;19(22):pii=20821.
[4] Boissier J, Moné H, Mitta G, Bargues MD, Molyneux D, Mas-Coma S. Schistosomiasis reaches Europe. Lancet Infect Dis. 2015 Jul;15(7):757-8.

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