

# Mumps presenting as epididymo-orchitis among young travellers: under-recognition, missed diagnoses and transmission risks

Joseph S Doyle, Emma K Paige and Denis W Spelman

## Clinical record

Two overseas backpackers presented to the emergency department of a tertiary referral hospital with epididymo-orchitis. Patient 1 was a 23-year-old unvaccinated Frenchman who presented in February 2009 with a 7-day history of unilateral, then bilateral, painful scrotal swelling. He had arrived in Australia a month before the onset of symptoms. He was treated with ceftriaxone and azithromycin for presumed sexually acquired epididymo-orchitis and was discharged "home" (to a youth hostel). He returned 10 days later with worsening scrotal pain, requiring admission for analgesia. Mumps serology revealed an elevated IgM but undetectable IgG titre. Test results for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* polymerase chain reaction (PCR) on first-pass urine were negative. On reflection, the patient recalled mild parotid pain a week before his scrotal symptoms. He recovered after 2 days of inpatient treatment with non-steroidal anti-inflammatory drugs, paracetamol and bed rest. Patient 2 was a 25-year-old English traveller who presented to the same hospital in February 2009 with fever for 3 days, then unilateral scrotal swelling and moderately severe headache. He had arrived in

Australia from England, via Thailand, a week earlier. He had been vaccinated against measles and rubella, but not mumps. On the sixth day of his illness, he required admission for pain management and inability to mobilise. Investigative ultrasounds showed features of epididymo-orchitis. An elevated mumps IgM titre was detected, and IgG was undetectable. Concurrently, a urinary PCR test for *C. trachomatis* was positive. He received oral doxycycline (for *C. trachomatis*), opiate analgesia and bed rest, and recovered after 4 days in hospital.

Patient 3 was a 25-year-old unvaccinated French woman who presented to the same hospital in March 2009 with 2 days of fever, marked parotid swelling and dry mouth. She was a travelling companion of, and shared accommodation with, Patient 1. A saliva sample tested positive for mumps PCR. She was hospitalised for 3 days for pain management and cross-infection prevention. She was given non-opiate analgesia and oral rehydration. Droplet isolation precautions, such as isolation in a single room and use of facemasks, gloves and gowns by those attending her, were instigated. ♦

In this article, we use a series of cases to highlight the diagnostic challenges, risk factors and public health implications of mumps orchitis. Although mumps orchitis is well described in the literature, some general practitioners and hospital clinicians may be relatively inexperienced in its diagnosis and treatment because of the low prevalence of mumps in Australia.

Mumps classically presents with a prodrome of fever, malaise and myalgia, and is followed by parotitis, which is usually bilateral.<sup>1</sup> However, 10% to 20% of symptomatic cases of mumps have no parotid symptoms.<sup>2</sup> The incubation period is 2 to 3 weeks, and the prodromal symptoms and parotitis usually persist for 7 days. People with mumps are infectious from 5 days before to 5 days after the onset of parotitis.<sup>3</sup> Individuals without parotid symptoms are also infectious.

Orchitis is the most common complication of mumps in post-pubertal males, occurring either unilaterally or bilaterally after 10 days of illness in up to 40% of this demographic with mumps.<sup>4</sup> Less common complications include meningitis (in up to 10% of patients), encephalitis, pancreatitis, arthritis and oophoritis.<sup>2</sup> Consequences of mumps orchitis include testicular atrophy (up to 50%), oligospermia or asthenospermia (up to 13%), and, rarely, sterility.<sup>2</sup> There is conflicting evidence for the use of subcutaneous interferon alpha-2b in preventing testicular atrophy in mumps orchitis, and the drug is not given routinely.<sup>2</sup>

Two doses of the combined measles–mumps–rubella (MMR) vaccine confer detectable IgG antibodies in 95% of people.<sup>5</sup> However, complete childhood vaccination is no guarantee of enduring immunity, as demonstrated by recent outbreaks in the United States and the Czech Republic where 84% to 90% of patients developing mumps had previously received two documented mumps vaccinations.<sup>6,7</sup> Australian residents born between 1978 and 1982 are more susceptible to mumps, as they escaped

natural mumps infection; were not targeted in the 1998 Measles Control Campaign, which involved MMR vaccination of primary school-aged children; and might have missed a second dose of MMR despite secondary school catch-up campaigns.<sup>8,9</sup> Similarly, an under-vaccinated cohort (around 60% of eligible children) exists in the United Kingdom following anxiety created by a well publicised 1998 paper associating MMR vaccine with autism, which was later rebutted by several studies, reviews and conclusions reached by the World Health Organization's Global Advisory Committee on Vaccine Safety.<sup>10</sup>

The three travellers described here missed childhood mumps vaccinations and opportunities for pre-travel vaccination. Herd immunity offers protection to unvaccinated individuals when more than 90% of the population is immune to mumps.<sup>10,11</sup> Yet when susceptible people travel outside communities with high vaccination coverage, they lose the protection of herd immunity. Patient 2 probably acquired mumps in Thailand, and his case illustrates the infection risks for under-vaccinated adults travelling to mumps-endemic countries.

In the absence of systemic symptoms, there are few clinical features that distinguish mumps from bacterial epididymo-orchitis. Sexually transmitted pathogens, including *Chlamydia trachomatis* and *Neisseria gonorrhoeae*, and other bacteria infecting the urinary tract, such as *Escherichia coli*, are common causes of epididymo-orchitis, and may be associated with urethral symptoms, or microscopic pyuria. The distinction between testicular swelling alone and epididymal involvement as a guide to bacterial causes is not helpful in practice because it is hard to assess clinically. Moreover, a recent review suggests that mumps itself can cause epididymitis in up to 85% of cases preceding a mumps orchitis.<sup>12</sup> Other viral causes of orchitis include rubella, coxsackievirus, human parvovirus and echovirus.

**Lessons from practice**

- Mumps transmission still occurs in Australia because of incomplete vaccination, either in Australia or overseas, or waning immunity over time.
- Mumps should be considered as a differential cause of epididymo-orchitis in an unvaccinated individual.
- For patients with epididymo-orchitis where no common urinary tract or sexually transmitted pathogen is isolated, mumps serological testing should be performed.
- There is no specific post-exposure treatment for contacts of a patient with mumps, but opportunistic vaccination of contacts could provide immunity against future exposure.
- Given ongoing mumps transmission in endemic regions, measles-mumps-rubella vaccination should be offered to Australians travelling abroad. ◆

Our report of Patient 2 highlights diagnostic uncertainty even with laboratory testing: results showed the presence of both *C. trachomatis* (positive urinary polymerase chain reaction [PCR]) and the mumps virus (positive IgM serology). Mumps IgM can be undetectable in vaccinated individuals (estimated 24%–51% sensitivity) but, when detected, it is highly specific (82%–96%).<sup>13,14</sup> Clinical features of the patient's condition, including orchitis and mild meningitis, were consistent with mumps, so concurrent infections were felt to be plausible. A convalescent serum sample showing a rising mumps IgG titre would have confirmed the mumps diagnosis, but testing was not possible because the patient resumed his travels. In severe cases requiring hospitalisation, or where there is diagnostic uncertainty and risk of transmission, serological investigations (or PCR assay before the emergence of detectable mumps IgM antibodies around the fifth day of the illness) are warranted to establish the diagnosis.

Mumps is highly infectious and spread by droplets. Infected travellers pose a particular risk of transmitting mumps because use of shared accommodation and public transport places them in close proximity to others. Notification of mumps is required in Australia, and can help public health authorities identify outbreaks and manage infectious patients. Voluntary isolation outside hospital of young adults is encouraged by public health authorities; however, there are no routine practices for enforcing isolation for mumps (Dr Rosemary Lester, Deputy Chief Health Officer, Victoria, personal communication). As home isolation during the infectious period is impractical for travellers living in communal accommodation, hospital admission could be justified to protect the health of both the individual and the public. Moreover, there is no proven prophylaxis for contacts. Neither use of normal human immunoglobulin nor MMR vaccination has been shown to prevent acquisition after exposure to mumps.<sup>15</sup> However, for contacts who have not had two documented MMR vaccinations, opportunistic offers of vaccination might, if taken up, confer immunity against future mumps exposure.

In the demographic of young men, particularly when travelling, GPs and emergency physicians need to be aware of mumps as an alternative cause of epididymo-orchitis. As the case of Patient 1 shows, mumps transmission in Australia is ongoing. Clinicians treating epididymo-orchitis should ask the patient about parotitis symptoms. Where a typical bacterial pathogen is not found, mumps serological testing is recommended. If mumps is recog-

nised, there is an opportunity to interrupt direct transmission by isolating patients, especially travellers living in close contact with potentially non-immune people. Finally, these case reports should remind clinicians to offer pre-travel MMR vaccination to young susceptible adults.

**Competing interests**

None identified.

**Author details**

**Joseph S Doyle**, MBBS, BA(Hons), MSc, Infectious Diseases Registrar  
**Emma K Paige**, MBBS, Medical Resident

**Denis W Spelman**, MPH, FRACP, FRCPA, Deputy Director of the Infectious Diseases Unit, and Head of the Microbiology Unit  
The Alfred Hospital, Melbourne, VIC.

**Correspondence:** joseph.doyle@mh.org.au

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