AB was a 33 year old Caucasian male. He presented with a seven day history of general malaise, back pain, fever, abdominal discomfort and profuse sweating. He complained of passing small volumes of urine frequently. He had a past history of anxiety and depression. He took citalopram 40mg daily. He had previously used cocaine and amphetamines. He lived in a caravan at his place of work – a local farm producing rats for exotic animal feed. There was no family history of note.

On examination he was noted to be sweating, but was afebrile with normal routine observations. Cardiovascular, respiratory and neurological examination were unremarkable. His abdomen was soft with some mild supra-pubic tenderness and no organomegaly. He had no skin rash, joint swelling or lymphadenopathy.

Due to his exposure to rats, leptospirosis was suspected; blood was taken for leukocytosis. Urinalysis revealed significant blood and protein, but was negative for leucocytes and nitrates.

The routine admission blood tests are shown in Table 1. He was noted to have an acute kidney injury, elevated transaminases and C-reactive protein with a reactive leukocytosis. Ultrasound kidney, ureters and bladder did not demonstrate any renal obstruction. After discussion with local renal unit, blood tests were sent for leukocytosis and nitrites.

During the course of the following 48 hours, his renal function continued to deteriorate. Ultrasound kidney ureters and bladder did not demonstrate any renal obstruction. After discussion with local renal unit, blood tests were sent for leukocytosis and nitrites. Infected rats were euthanized.

The natural history of the illness.

The incubation period is 1 to 6 weeks. Common symptoms include flu-like illness, fever, headache, vomiting, abdominal and back pain. There is some variation in clinical features between different strains of the virus. Table 3 shows the natural history of the illness.

The worldwide incidence of Hantavirus infection is about 150,000 per year, with over 50% of those in China. Hantavirus is rare in the UK, where the culprit variant is Seoul virus [SEOV].

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Table 2: Seroprevalence in UK

<table>
<thead>
<tr>
<th>Phase of illness</th>
<th>Time of occurrence</th>
<th>Clinical features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-7 days</td>
<td>Fever, Headache, Constitutional symptoms</td>
<td>Hantavirus infection</td>
</tr>
<tr>
<td>7-10 days</td>
<td>Back pain, Fatigue</td>
<td></td>
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<td>10 days</td>
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<tr>
<td>14 days</td>
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<td>2 weeks</td>
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<tr>
<td>3 months</td>
<td></td>
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</tbody>
</table>

Clinical Features

- Patients will have positive serology [IgG and IgM] with the onset of symptoms. Viral RNA load positively correlates with severity.
- Management is predominantly supportive with renal replacement therapy when indicated.
- The mortality for Seoul virus is <1%, but can be significantly higher with other strains.

Hantavirus in Wales

This patient worked in a local rat farm. Figure 1 shows a photograph of the barn in the farm, taken as part of a Public Health Wales investigation. The plastic tubs contained the rats in a bedding of light straw, estimated by the owner to be 'a couple of thousand' rats. During the investigation there was no evidence of hand washing facilities in the barn, and the barn was noted to contain a microwave and kettle. The rat bedding was changed when required and was not dampened before changing. This business had been previously implicated in a similar outbreak in 2015, but had since relocated. Infected rats were euthanized.

Figure 1: The rat barn

Discussion

What is Hantavirus?

The hantaviruses of the order bunyaviridae are negative sense RNA viral pathogens that infect humans by inhalation of infected rodent urine or droppings. They do not cause disease in rodents, but numerous strains can cause illness in humans.

Hantavirus rose to prominence during a major outbreak in the Korean war. Three thousand American troops were affected by Korean Haemorrhagic Fever, with an estimated 5-15% mortality. Hantaan virus strain [HTNV] was eventually isolated from the lungs of local rodents in 1976 and was implicated as the cause of the outbreak. In 1993, the Four Corners outbreak in the USA demonstrated a new Hantavirus syndrome with predominantly lung involvement and a 50% mortality. This time, Sin Nombre virus [SNV] was isolated from the local rat population.

Epidemiology

The worldwide incidence of Hantavirus infection is about 150,000 per year, with over 50% of those in China. Hantavirus is rare in the UK, where the culprit variant is Seoul virus [SEOV]. Table 2 demonstrates the results of a recent study of different at-risk groups in the UK. Interestingly, seroprevalence was lower in traditional at-risk groups such as sewer workers when compared to the control group. This is thought to relate to the use of personal protective equipment to limit exposure.

Conclusion

Hantavirus is a rare, but potentially fatal cause of acute kidney injury. This case demonstrates the importance of taking a full occupational and social history as a routine part of medical assessment. Hantavirus should be considered in any patient presenting with acute kidney injury and a history of rat exposure.

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References