Fact sheet: Brucellosis

Brucellosis is the most common bacterial zoonosis worldwide, yet it remains grossly underdiagnosed and under-reported in many countries where it is endemic, including South Africa. *Brucella melitensis* causes the vast majority of human brucellosis cases, followed by *B. abortus* and *B. suis*. Human brucellosis is a notifiable medical condition in South Africa.

The usual reservoirs of *B. melitensis* in South Africa are goats and sheep; occasionally, cattle are also affected. Pregnant goats, sheep and cows may abort and shed *B. melitensis* in their milk. Brucella has also been previously documented in wildlife in South Africa. *B. melitensis* in animals is a controlled disease and any cases must be reported to the Department of Agriculture, Forestry and Fisheries.

Persons working in occupations where contact with animals/animal products frequently occur are at highest risk of brucellosis (farmers/farm workers, abattoir workers, veterinarians and other animal-health workers etc.).

Humans acquire brucella infection by 3 routes:

- direct contact with infected animals or their secretions through skin cuts/abrasions or conjunctival splashes
- inhalation of contaminated aerosols (uncommon)
- consumption of unpasteurised dairy products (incl. milk, yoghurt, cheese)

It is important to note that pasteurised/adequately boiled milk or milk products, and cooked meat from infected animals are safe to consume and do not transmit infection.

Human-to-human transmission is extremely rare, but case reports have described vertical transmission (from pregnant mother to foetus), transfusion-transmitted/transplant-associated infection, and sexual transmission of brucellosis.

Owing to its ability to cause a wide spectrum of clinical manifestations with a tendency towards chronicity and persistence, brucellosis is one of the three ‘great imitators’, along with TB and syphilis. It evolves into a granulomatous disease capable of affecting any organ system. The clinical features depend on the stage of disease as well as the organ/s involved. Fever is the most common feature, followed by osteoarticular involvement, sweating and constitutional symptoms. Hepatosplenomegaly is evident in a third of patients, and lymphadenopathy in 10%. Osteoarticular manifestations (sacroilitis, spondylitis, peripheral arthritis and osteomyelitis) account for over half of the focal complications, while pulmonary disease (pneumonia, pleural effusion) may be evident in up to 16% of complicated cases and genitourinary complications (including glomerulonephritis, epidydimoorchitis and renal abscesses) can be
found in 10% of patients. Neurological involvement may be evident in about 6% of cases, with protean manifestations including peripheral neuropathy, chorea, meningoencephalitis, transient ischaemic attacks, psychiatric features, or cranial nerve palsies. Less frequent manifestations include mucocutaneous involvement (papular rash, purpura, Stevens-Johnson syndrome) and endocarditis (the most serious complication). Anaemia is the most common haematological abnormality, affecting a quarter of cases. Leucocytosis, leucopenia and thrombocytopenia are seen in similar frequencies (±10%).

Brucellosis in childhood may easily be missed and a high index of suspicion for the disease is important. Children usually present with monoarticular arthritis (usually hips/knees) rather than the sacroiliitis seen in adults.

The diagnosis of brucellosis can be problematic. Isolation of Brucella spp from blood, bone marrow or other tissue remains the gold standard. However, isolation rates depend on the method used (varying from 15% - 90%), the stage of disease and previous use of antibiotics. Serology is playing an increasing role in diagnosis, with the traditional Rose Bengal test largely having been replaced by ELISA tests with higher sensitivity and specificity. However, serology needs to be interpreted cautiously: no single titre is always diagnostic, but most cases of active infection have titres of 1:160 or higher. PCR tests have shown promise, but standardisation remains problematic and their diagnostic value requires further assessment.

Treatment of brucellosis is complicated by treatment failures and relapses. The WHO has not updated its recommended treatment regimes for brucellosis since 1986; these regimes have been found to have treatment failure and relapse rates ranging from 4.6% to 24%. A meta-analysis has shown that dual or triple regimes including an aminoglycoside (doxycycline-streptomycin/gentamicin or doxycyline-rifampicin-streptomycin/gentamicin) significantly reduces treatment failure and relapse rates, and are currently recommended as first-line treatment regimes. Duration of treatment is 6 weeks for doxycycline and rifampicin, and 2 weeks for aminoglycoside therapy (daily intramuscular injections). Patients require prolonged follow-up to monitor for further complications or relapse.