

Bovine Tuberculosis Testing and Freedom Protocol

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Presentation outline

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Introduction

- Bovine tuberculosis
 - Caused by *M. bovis*
 - Zoonotic disease
 - Affects health and production
 - Weight loss and lymph node enlargement
 - Characteristic granulomas in lungs, lymph nodes and other organs



Introduction

- Bovine tuberculosis
 - Sometime small “rice grain” granulomas
miliary tuberculosis
 - Spread mainly through aerosols
 - Greater spread in intensive systems
 - Calves infected through ingestion of infected milk
 - Pasteurisation inactivates bacterium



Legislation

- Bovine tuberculosis is Notifiable in terms of Animal Health Act, 2011 (Act No. 1 of 2011)
- Anyone should report suspicion in terms of Section 15 (1)(b) and (2) of AHA
- The whole country is a protected area for purpose of preventing introduction of bovine tuberculosis

Bovine tuberculosis testing

- Intradermal Tuberculin Test
 - The OIE endorses intra-dermal tuberculin test for international trade
 - Test done using purified protein derivative (PPD)
 - Bovine tuberculin
 - Avian tuberculin
 - Detection of swelling (delayed hypersensitivity) 72 hours later
 - Test performed in mid neck area
 - Single intradermal – bovine tuberculin only
 - Comparative intradermal – bovine and avian tuberculin

Bovine tuberculosis testing

- Intradermal Tuberculin Test
 - Sensitivity (Se)
 - Single: at least 80%
 - Comparative: 90-98%
 - Specificity (Sp) greater than 99.67%
 - Test validated only in bovidae and cervidae
 - Test will not detect early infection (less than 6 weeks)
 - Gives false negatives in chronic cases with severe pathology
 - With poor storage (outside cold chain) can get false negative
 - Should not be used within 42-60 days of another test since sensitisation gives false negative

Bovine tuberculosis testing

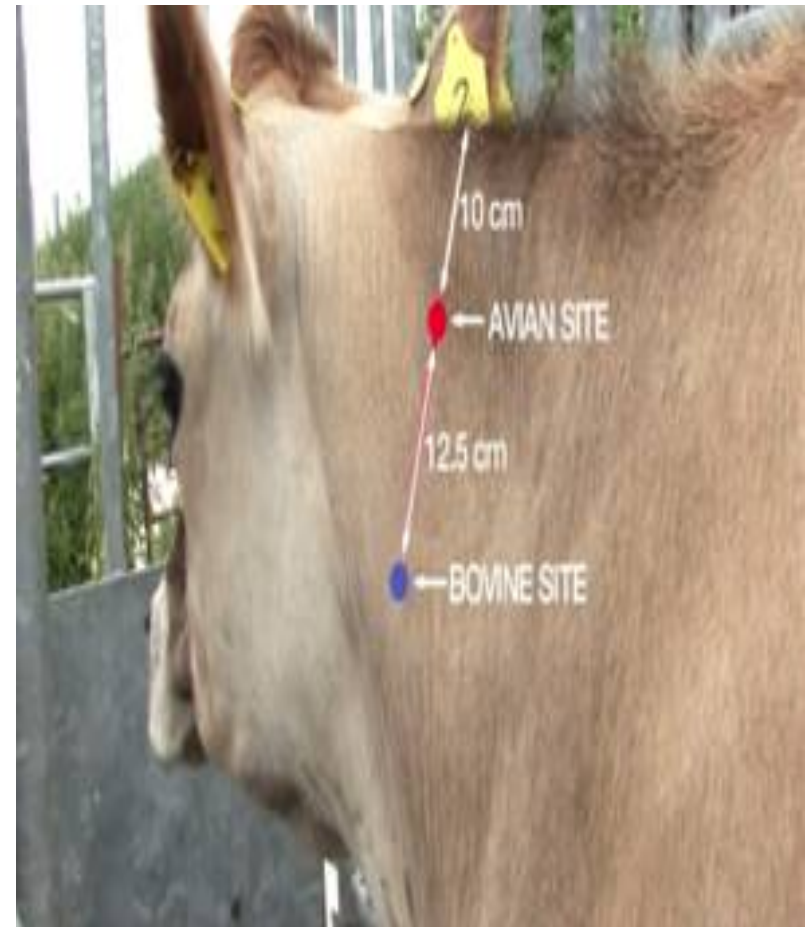
- Other tests for *M. bovis*
- Bacterial culture remains the gold standard (Se: 98%)
- Gross pathology (Se: 89%)
- Histopathology (Se: 93%)
- Gamma interferon
- PCR
- Animal inoculation (rarely used due to animal welfare concerns)

Bovine tuberculosis testing

- Reliability depends on:
 - Proper injection of the tuberculin
 - Accurate measurement and comparison of reactions 72 hours later
 - Recording of clinical observations
 - Dosage of tuberculin used
 - Site of injection
 - For comparative test both injections (avian and bovine) should be in the same plane in middle third of neck
 - Avoid subcutaneous injection
 - State of nutrition
 - Desensitisation by tuberculin injected up to 60 days prior

Bovine tuberculosis testing

- Test procedure
 - Clip and clean injection site to be 2.5 x 2.5 cm
 - Measure a fold of skin with callipers and mark the site
 - Tuberculin loaded syringe should not contain air
 - Needle should protrude more than 2-3 mm from adaptor
 - Short bevel edged needle attached to tuberculin charged syringe injected obliquely into deeper layers of skin



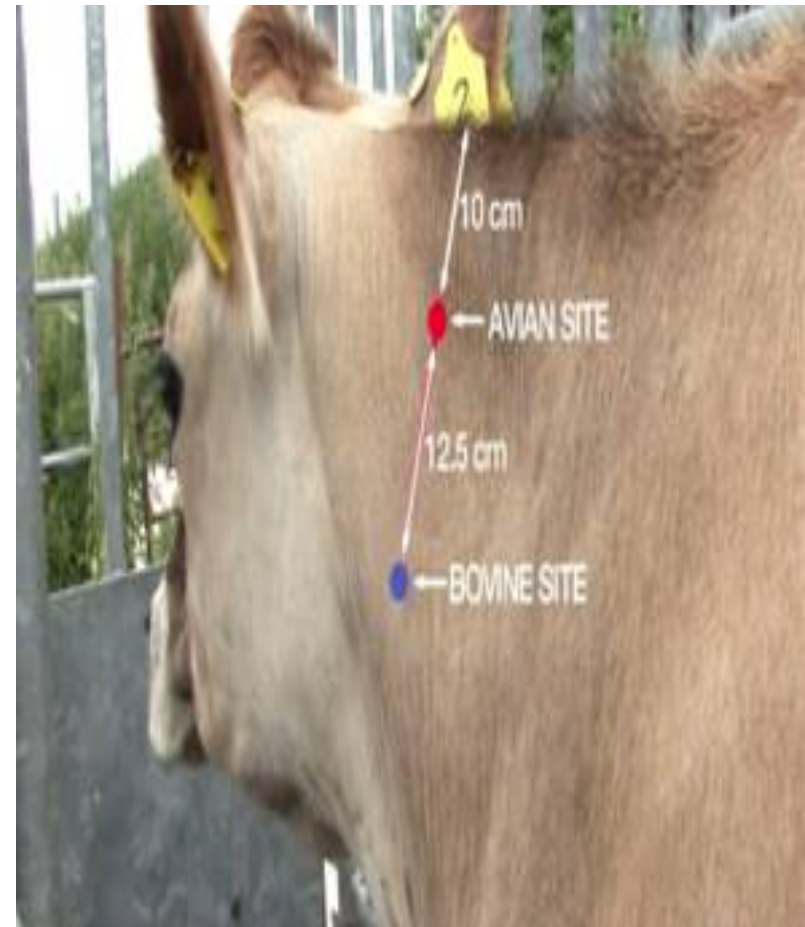
Bovine tuberculosis testing

- Test procedure
 - The dose of tuberculin should be 2000 IU (avian or bovine)
 - Palpate pea-like swelling at injection site
 - Distance between avian and bovine to be 12-15 cm for comparative
 - Measure skin fold thickness at each injection site 72 hr later
 - Same person to measure before and after injection



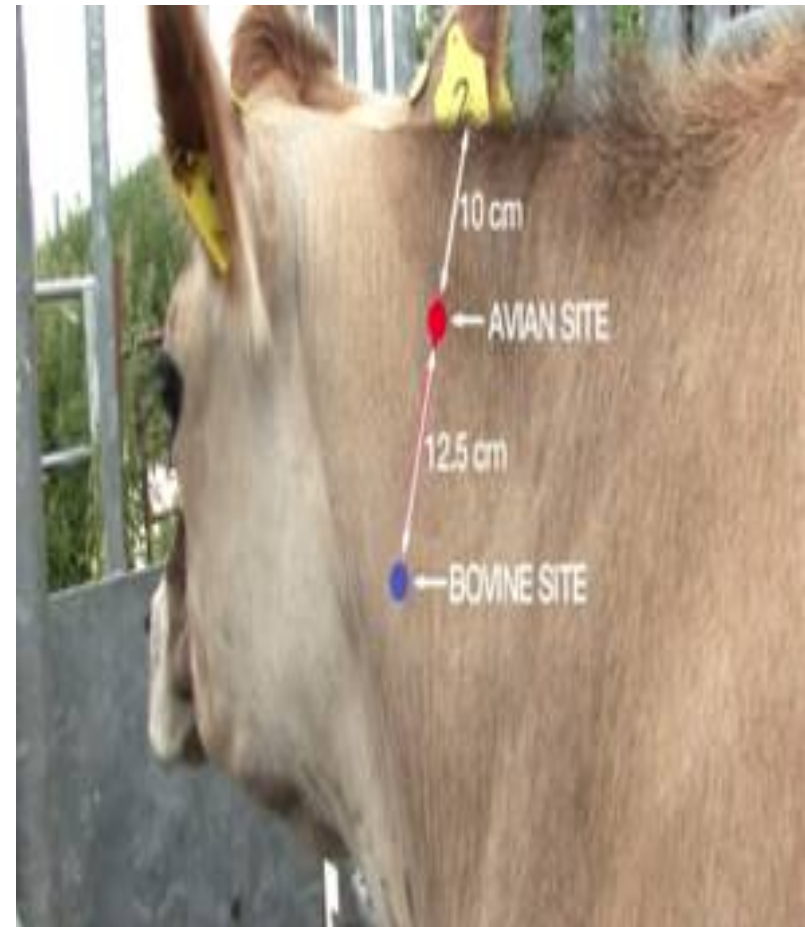
Bovine tuberculosis testing

- Test procedure
 - Syringes and needles used must be for this purpose only
 - Syringes to be clearly labelled avian/ bovine
 - Spare needles, adaptors, identification thumb nobs must be available
 - Syringes must be emptied for a new herd
 - Empty syringes at end of day to prevent crystallisation of tuberculin
 - Needles to be cleaned with methylated spirit soaked cotton between injections



Bovine tuberculosis testing

- Equipment list
 - Protective clothing and disinfectant
 - Syringes, needles, adaptors, spanners
 - Callipers
 - Curved scissors or clippers
 - Cotton wool and methylated spirit
 - Documentation forms
 - Thermometer, stethoscope
 - Reactor tags
 - Tuberculin (avian, bovine)
 - Keep refrigerated or in cooler box
 - Protect from light
 - Use on day of opening vial



Bovine tuberculosis testing

- Reading of test
 - Record findings on prescribed form
 - Examine, palpate and measure skin reaction after 72 hr
 - Note clinical signs
 - Oedema
 - Exudation
 - Necrosis
 - Heat
 - Pain
 - Check prescapular lymph node



Bovine tuberculin test interpretation

- Single intradermal
 - Negative
 - Increase in thickness less than 2mm
 - No clinical signs
 - Inconclusive
 - Increase in thickness more than 2mm but less than 4mm
 - No clinical signs
 - Must be retested after 42-60 days if not negative will be considered positive
 - Positive
 - Increase in thickness more than 4mm
 - Clinical signs present
 - May be tested with comparative or blood test
- Intradermal comparative
 - Negative
 - Increase in thickness at bovine site less than or equal to that at avian site
 - Inconclusive
 - Increase in skin thickness at bovine site is greater than at avian site by less than 4mm
 - Retest after 42-60 days if not negative considered positive
 - Positive
 - Increase in skin thickness at bovine site greater than 4mm than at avian site

Bovine tuberculosis herd freedom

- Cattle showed no sign of tuberculosis or lesions at ante- or post mortem inspection for at least one year
- All cattle over 6 weeks passed two consecutive tuberculin tests at least 6 months apart
- If regaining status after outbreak, the first test should be done at least 6 months after the removal of the last positive case

Maintenance of tuberculosis freedom

- The herd tested negative during the annual test
- The herd tested negative every 2 years if annual percentage of infected herds is less than 1% of all herds in the country or zone during the last 2 years
- The herd tested negative every 3 years if annual percentage of infected herds is less than 0.2% of all herds in the country or zone during the last 4 years
- The herd tested negative every 4 years if annual percentage of infected herds is less than 0.1% of all herds in the country or zone during the last 6 years

Maintenance of tuberculosis freedom

- Introduction of cattle into a free herd
 - Cattle introduced to a free herd must come from a free herd
 - If not from free herd then the cattle must be isolated for at least 90 days and prior to entry subjected to two tuberculin tests at least 6 months apart with negative results with the second test done within 30 days prior to entry into herd

Bovine tuberculosis free auctions

- Auctioneers to submit application at least 2 weeks in advance
- Only cattle from free holdings to attend
- Purchase from auction to free holdings without loss of status
- The auction facilities should have been rested for at least 14 days

Documentation

- Bovine tuberculosis questionnaire
- Certificate of freedom from bovine tuberculosis
- Notification of positive test results