

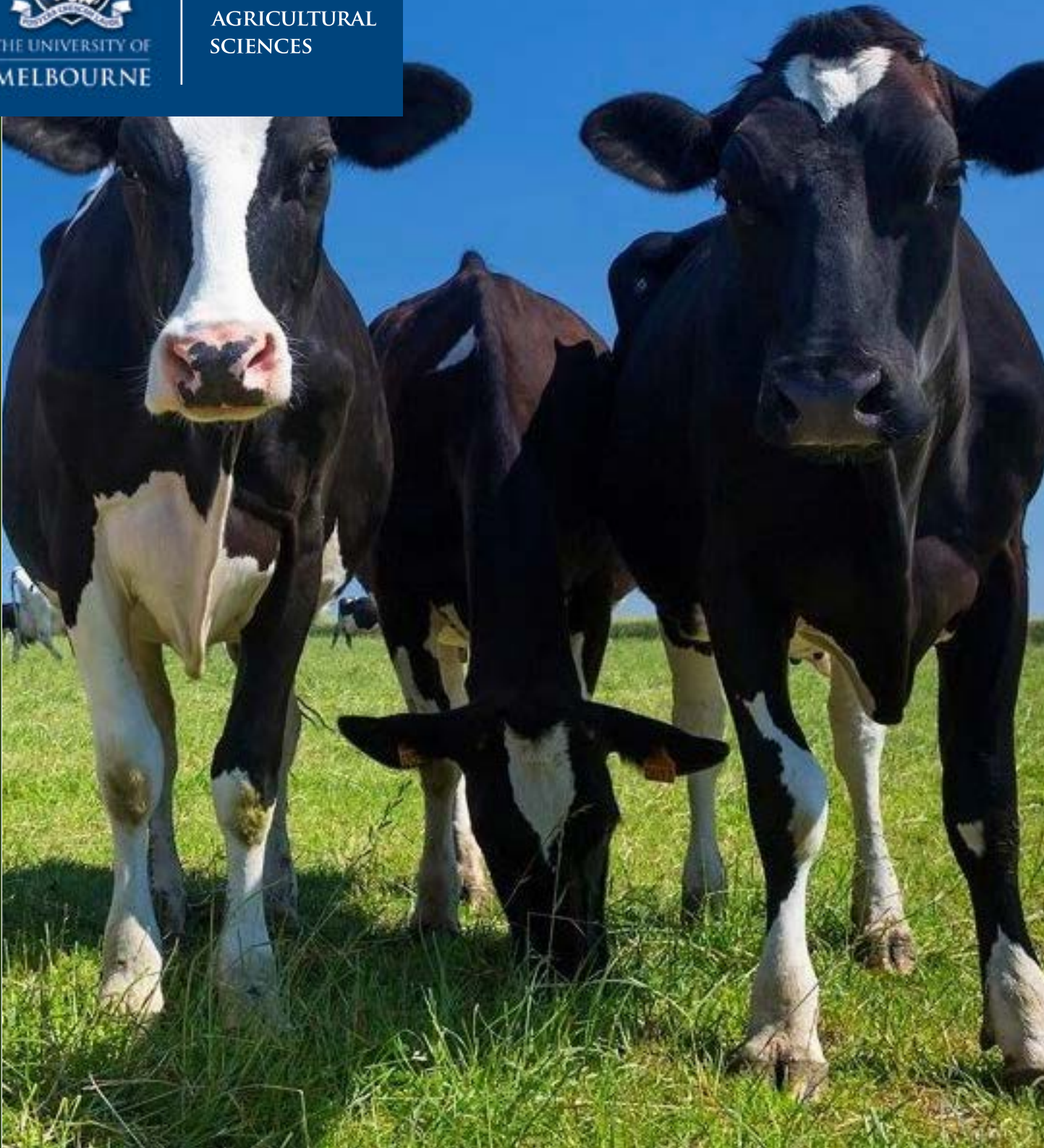


THE UNIVERSITY OF
MELBOURNE

FACULTY OF
VETERINARY &
AGRICULTURAL
SCIENCES

VETERINARY BIOSCIENCE: CARDIOVASCULAR SYSTEM

VETS30014



CASE STUDY

BUNNINGS DISEASE

HOW TO COMPLETE A CASE STUDY

You will need to work through each case study in your group.

- Save a copy of this PDF document on the Desktop of your computer before you start work.
- You will be working together as a group to complete the workshop.
- You need to complete each activity sequentially, in the order that they are presented in this file. Do not jump ahead.
- This file gives you detailed instructions for completing each activity. Ask your tutor if you have any questions.
- For some activities, you will be asked to record your answers to the questions by typing them into this file. You should save this PDF file each time you complete one of these questions, to make sure that your work does not get lost.

GUIDELINES FOR EFFECTIVE GROUP WORK

Your group will work at its best when everyone feels comfortable and “safe” to contribute to discussion. Here are a few suggestions that might help promote a safe and effective group work environment:

- Ensure that you all know one another’s names- and that you use them during your conversations.
- Effective listening is a key to effective group work. Respectful listening enhances a positive group dynamic, and creates a space where it is safe for all to contribute.
- Taking time to discuss is really important- discussing involves questioning and responding, reviewing and reflecting, sharing understanding. This is where deep learning occurs. It can often be greatly enhanced by visualisation- by sharing of ideas, summaries and processes on your white board and by collective rephrasing and reframing of ideas.
- Sharing of tasks and responsibilities is also important in group work. Perhaps make a roster and each week have a different group member take responsibility for the keyboard, and for completing your interactive pdf.

INSTRUCTIONS

Enter each group member's name, land email address below. After you have completed working through this document, save a copy and follow the instructions at the end of the document to share it with your group via the LMS or email.

GROUP NUMBER

Name	Email Address

INTRODUCTION



You have decided to undertake a "working holiday" in England and are currently employed in a cattle practice in St. Columb Major in Cornwall in the South-West of the country.

It is a chilly day in winter and one morning Jeremy Dudden of Tregonning Farm calls you to say that one of his dairy cows has had a dramatic decline in milk production, is losing weight and appears to be eating poorly.



Bunnings Disease

Part 1: Initiating the Consultation

QUESTION 1

- What techniques did the vet use to initiate the consultation?

HISTORY

Watch the video clip of the vet obtaining the history.



Bunnings Disease

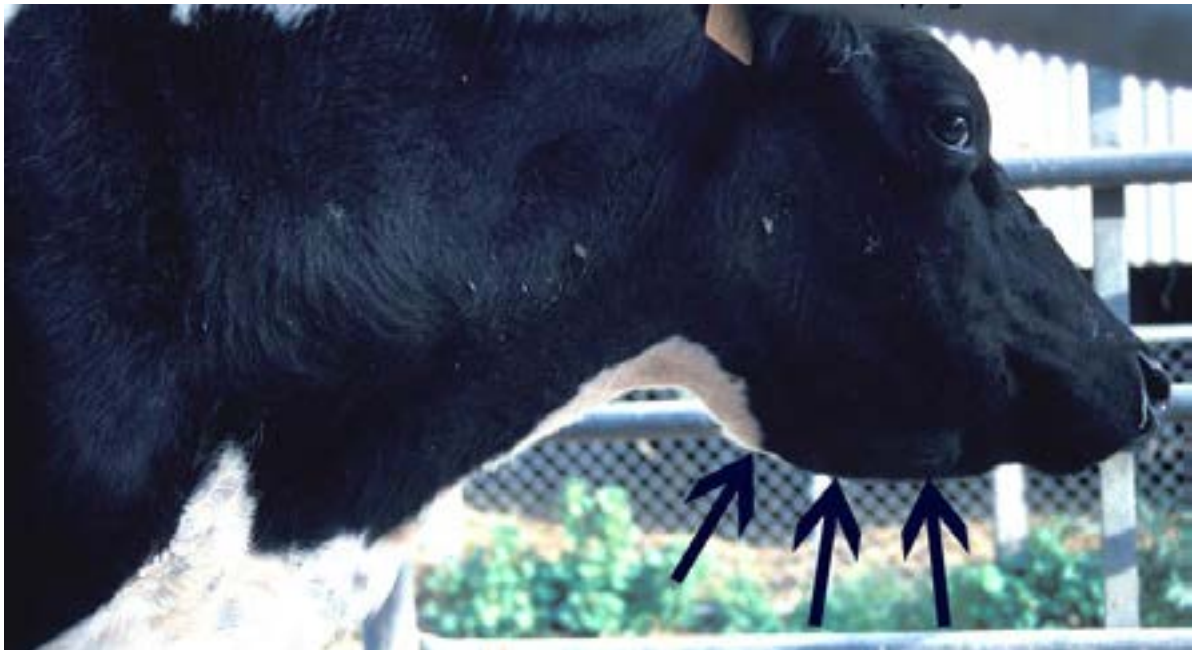
Part 2: Gathering Information

QUESTION 2

- List the **key information** about the cow below. Key information is all the information that may be relevant in assessing her current condition.
- Identify the cow's **main problems** and make a list of how they may be caused using a systematic approach. We will call each item on this list a **hypothesis**. For each hypothesis discuss how it may be causing the identified problem.
- Based upon this information refine your hypotheses – decide whether they are more likely, less likely or can be excluded. Provide an explanation for each change. Give a mechanism for any new hypothesis.
- What further information that you can obtain from a physical examination may help you refine your hypotheses?

PHYSICAL EXAMINATION

The farmer has corralled the cow into a yard, where you observe her while listening to Jeremy. You notice that she has an arched back and appears to be reluctant to move. You also notice that she has a soft swelling under her jaw, and along her ventral thorax (brisket).



Parameter	Findings	Normal
Temperature °C	39.7	38.0 - 38.5
Pulse	85	60 - 80
Jugular vein	Distended and pulse visible two thirds of way up neck	Normally visible one third of way up neck with head in neutral position
Respiration	32	20 - 40
Mucous membrane colour	Pink	Pink
Thoracic examination (auscultation)	Muffled heart sounds on auscultation	-
Abdominal auscultation	ruminal stasis	1-2 ruminal contractions over 1 minute
Rectal examination	Firmer than normal faeces present	
Udder examination	No hard or inflamed areas	
Ketones in urine (Rothera's test)	Negative	Negative
Examination of milk	No clots present	Lack of clots (mastitis)

As an aid to your physical examination you perform a withers pinch test and a bar test.

You perform the **withers pinch test** by grasping a fold of skin over the withers in an attempt to cause the cow to dip her spine. When you do this the cow seems reluctant to dip her spine and lets out a grunt every time you perform the test.

The **bar test** involves applying upward pressure to the cranial abdomen. You perform the test by standing on one side of the cow with the farmer on the other side. You place a wooden bar under the cow just behind the xiphisternum and slowly raise the bar and rapidly lower it. When you do so the cow also lets out a grunt.

QUESTION 3

- What is the most reliable way to obtain a urine sample from a cow without resorting to urinary catheterization?
- What additional diagnostic information does the withers pinch and bar test provide?
- Summarize the additional information obtained from the physical examination. Do you want to add to your list of presenting problems?
- What organ system or systems do you think may be involved?
- Based upon this information refine your hypotheses – decide whether they are more likely, less likely or can be excluded, and explain the rationale for your prioritising of your differential diagnoses. On the white board draw a flow diagram mechanism to explain how your most likely hypothesis relates to the clinical signs in the cow.
- What further tests could be performed to differentiate between these diagnoses or to confirm your hypothesis?

QUIZ 1

Click back to the LMS and attempt **Quiz 1** before continuing.

DIAGNOSIS

From the history and physical examination you conclude that the cow is probably suffering from an inflammatory condition (causing pyrexia) that this is having systemic effects (poor appetite and reduction in milk yield). The urine test has ruled out ketosis, which can affect dairy cows at this point in their lactation and the lack of clots in the milk and a normal udder suggest that mastitis is unlikely. The lack of ruminal movements and finding of firm faeces on the rectal examination suggest a gastrointestinal problem. The grunting sounds she is making, her arched back and her response to the pinch test suggest a painful abdominal condition. The distinctive heart murmur, the exaggerated jugular pulse, in conjunction with the submandibular and brisket oedema suggest involvement of the heart.



Bunnings Disease Part 3: Explanation and Planning

QUESTION 4

- Reflect on the vet's use of jargon in her explanation. Did she explain the problem clearly and simply?
- Explain the reasoning behind the two tests the vet suggests she could use to confirm the diagnosis.
- Are there other tests you could run? Explain why you chose them.

QUIZ 2

Click back to the LMS and attempt **Quiz 2** before continuing.

QUESTION 5

- If you believed that the foreign body was localised to the abdomen and decided to conduct an exploratory laparotomy, on which side of the abdomen would you make your surgical approach - give a reason for your answer. Where would this incision be located?
- What physical problems might you encounter exploring the abdomen of a cow?
- Can you explain the distension of the jugular veins in the cow's neck?

QUIZ 3

Click back to the LMS and attempt **Quiz 3** before continuing.



Bunnings Disease

Part 4: Discussing Bad News

QUESTION 6

- List two ways the vet expressed empathy to the farmer in this discussion.



Bunnings Disease

Part 5: Confirming the Diagnosis

You attend the local knackery to perform a post mortem examination on the cow. Fortunately the knacker man has already done most of the work for you and has removed what he considers the cause of death! He shows you the cow's heart as shown below together with a piece of wire he had found penetrating from the reticulum into the pericardial sac. There was an abscess on the floor of the cranial abdomen walled off by omentum but with a sinus track leading through the diaphragm.



The image of the heart shows what is sometimes called a 'bread and butter' heart due to a severe organising fibrinopurulent pericarditis. This has occurred secondary to the ingestion of a piece of wire and penetration through the reticulum and diaphragm into the pericardial sac. Build-up of exudate in the pericardial sac has resulted in the symptoms of submandibular oedema and ultimately death of the cow.

QUESTION 7

- Draw a simple diagram on your white board to demonstrate the relationship between the rumen, reticulum, pericardium and heart.
- What are the consequences for cardiac function of accumulation of fluid or inflammatory exudate in the pericardial sac?
- Draw a schematic flow diagram illustrating the cardiovascular changes that occur as a result of a fibrinopurulent pericarditis. Within your flow diagram you should include an explanation of the clinical signs seen in a the cow including particularly submandibular oedema, jugular venous distension and muffled heart sounds.
- What are the most common sources of wire seen in cows with reticular penetrations? How would you investigate this particular farm further?

PROGRESS

You return to Tregonning Farm a few days later to discuss the results of the post mortem with Jeremy and take a walk around the farm looking for sources of wire. Jeremy informs you that there have been no recent bonfires on the farm and you notice that the roofs of the cowsheds are covered in corrugated iron in good condition. You notice that the silage is fed using a feeder wagon. A silage cutter is used to cut and lift silage out of the silage clamp into the feeder wagon, where it is mixed up.



QUESTION 8

- Looking at the photography of the silage clamp above, are you able to identify the most likely source of the wire found in the two cows?
- What preventative measures could you take to avoid similar problems arising in the future?

OUTCOME

Traumatic reticuloperitonitis/pericarditis (commonly referred to as “Hardware Disease”) is caused by fragments of wire inadvertently eaten by cattle which gravitate towards and lodge within the reticulum. In some cases the wire may penetrate the rumenoreticular wall and migrate through the surrounding areas of the abdomen and thorax. This can result in localized or generalized peritonitis or pericarditis. In some cases sudden death from haemopericardium secondary to laceration of cardiac blood vessels may result.

Left lateral view of the interior of the rumen and reticulum. The arrow indicates the close proximity of the reticulum to the pericardial sac and heart. Reproduced from Orpin and Harwood In Practice (2008) 30, 544-551. Reproduced, with permission, from Elsevier and Prof S. Done



Metallic fragments such as nails, bits of fencing, metal shards and radial steel wire from disintegrating tyres have all been implicated. Herd outbreaks of significant mortality and morbidity may develop when cows are exposed to the ash from bonfires or are fed on silage that has been weighted down with disused tyres which are then inadvertently chopped up in a feeder wagon.

Typical amount of wire in a single tyre. Reproduced from Orpin and Harwood In Practice (2008) 30, 544-551



The clinical signs of disease are dependent on the nature and severity of the penetration and may be masked by the use of antibiotic therapy by farmers before a veterinary examination is performed.

Prevention of this disease may involve reducing exposure of cattle to potential sources of metallic objects, together with the administration of ruminal magnets. These magnets have been shown to “trap” metallic fragments within the reticulum, thus aiding in the prevention of this disease syndrome.

Rumen magnet	Rumen magnet filled with metallic debris
	

REFERENCES

Orpin P. and Harwood D. (2008) Clinical management of traumatic reticuloperitonitis in cattle. In Practice 30, 544 - 551

Cockcroft P. and Jackson P. (2004) Clinical examination of the abdomen in adult cattle. In Practice 26, 304 - 317

UPLOAD INSTRUCTIONS

You have completed the case study. To share the completed document with your group:

1. Save this file to the Desktop
2. Open the LMS site
3. At the bottom of the left-hand side menu, under the My Groups heading, click your group name.
4. Click the File Exchange link, then Add File.
5. Enter a title, then click Browse and locate the document.
6. Hit Submit to share the document with your group.