Introduction

This instalment of the How I Treat series describes the treatment of toxic mastitis in beef cattle.

Beef cattle mastitis is perhaps a little different than that in dairy cattle because in theory the bacteria that are generally regarded as obligate parasites of the bovine udder and those that are spread by milking machines (such as Strep. agalactiae and coagulase positive staphs) are unlikely. E.coli, Pseudomonas and other causes of severe toxic mastitis will be more common.

As is usual now, emails were sent to a group of ACV members chosen at the whim of the author asking for a paragraph about how they go about the treatment of this disease and the advice they give. Some responses were also received via an ACVList discussion. Here are some of the responses …

Results

“Really something that is not seen here other than obvious trauma eg downers; cows don’t have much milk to start with normally. Most treatments in my practice would be a shot of LA Oxytetracycline (maybe this might change with the new ESIs) and a shot of Flunixil."

“We see mastitis in beef cattle mostly on smaller farms, often beef X dairy cows. We don’t culture many but would guess most to be environmental bugs, often older cows, dropped bags, bottle teats, calves not sucking out quarters properly. Treatment: Normally just parenteral antibiotics, if cow quiet may use intramammarys, normally use Metacam as NSAID, although if really toxic use finadyne and fluids. Other advice: Normally leave calf on unless really sick, if using intramammarys then get to farmer to strip out affected quarters.

Cull potentially susceptible cows, cull cows with previous cases, calve in clean dry areas (if possible), rotate calving areas."

“I tend to see mastitis in beefies just prior to or within a week of calving. Only ever see systemically unwell cases as these are the ones the clients find.

Embarrassed to say I have never done C&S on a beef case. Assume environmental, but could be any of the usual dairy culprits. We usually use IV alamycin and IM LA Oxytet (for convenience of client), repeat in 3 days. IV Metacam as NSAID, Vit B12, intramammarys- usually Special Formula Forte V once daily for 5 days (Orbenin LC sometimes - depends what I have in the car). In severely unwell I will also give 1L hypertonic saline and 30L clean water (warm if available) via stomach tube. I recommend twice daily stripping (if not too fractious). Leave calf on and beware meat withhold for calf. Keep in area with easy access to good quality hay and water. I haven’t ever had to cut a teat off or drain a quarter, they seem to burst themselves and to be honest I’ve never quite been game enough! I don’t think I have ever had a recumbent case survive and now usually recommend immediate shooting unless client very keen to try. Prevention: Try to calve on clean, dry (as possible) paddocks to minimise contamination of the udder. Close monitoring of herd for any sign of illness for early intervention.”

“I have observed mastitis in a small herd of beef cattle in southern Qld. Incidence varied from year to year and was worst in years when feed was good just before calving and cows made a lot of milk. Case definition was obvious swelling and redness in the udder. None ever required treatment. Some always went on to develop large firm swellings and redness in the udder. None ever required treatment. Some always went on to develop large firm scarred up quarters and bottle teats. Treatment was to cull these at weaning to remove the source of infection for the next year. Bottle teats are a common problem in many beef herds in Queensland. In the his work on calf wastage (Holroyd RG 1987 Foetal and calf wastage in Bos Indicus cross beef genotypes, Aust Vet J : 64; 133-137) Dick found that when they examined the udders of cows with bottle teats most had evidence of mastitis. This is a common problem in many northern cattle herds, but esp in central Qld where feed is better and cows can make a lot of milk. Culling reduces the incidence. Spread of mastitis pathogens within a beef herd is by cross suckling. If a cow gets mastitis and starts to kick her calf off due to pain and discomfort or just plain lack of milk it will just go and suck another cow spreading the infection physically from cow to cow. Isolating clinically affected cows and their calves is probably the best way to stop spread but this can be difficult to do before they have managed to spread it.

In addition to the above reference, there is some literature in the US if you dig around. It is a while since I last looked but I did research the issue carefully in the late 1990’s. References I found in addition to the above were:


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“Given that beef cows rarely enter a dairy, the cow associated streps and staphs and mycoplasmas are likely to be rare. Common bacteria might include skin staphs, E. coli, and other environmental, so broad spectrum is the way to go. The following is a table of % sensitivity to different antibiotics based on unpublished data from almost 3500 cultures some years ago in our area:

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<th>OXYT</th>
<th>NEO</th>
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<tr>
<td>Staph. aureus</td>
<td>100</td>
<td>98</td>
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<td>89</td>
<td>99</td>
<td>100</td>
<td>100</td>
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<tr>
<td>Strep. uberis</td>
<td>99</td>
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<td>98</td>
<td>100</td>
<td>98</td>
<td>37</td>
<td>100</td>
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<td>S. dysgalactiae</td>
<td>97</td>
<td>16</td>
<td>98</td>
<td>99</td>
<td>99</td>
<td>61</td>
<td>100</td>
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<tr>
<td>S. agalactiae</td>
<td>98</td>
<td>5</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>34</td>
<td>100</td>
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<tr>
<td>G-ve Bacteria</td>
<td>95</td>
<td>95</td>
<td>4</td>
<td>88</td>
<td>5</td>
<td>90</td>
<td>95</td>
</tr>
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If you don’t care too much about the streps (and in my experience the streps are unlikely to be involved with mastitis causing death in beef cattle), then the cephalosporin intramamaries, Forte-V or ampiclox/clavet might all be good in theory. Avoiding Cloxacillin and Erithromycin seems wise. The bigger question is why you would use an intramammary at all. Presumably mastitis in beef cattle is associated with systemic signs (or it would not have been picked up). In my book that would make it worthy of parenteral treatment. I’m unsure that there is much evidence to say that intramamaries add much in the way of efficacy in the presence of an injectable antibiotic… Many Australian dairy farmers seem incapable of using only injectable antibiotics for mastitis treatment – possibly because when they use a tube there is an immediate change in the milk (to blue) and then it gradually gets better. When you inject something into the rump (or preferably the neck, particularly if it’s oxytetracycline) the milk does not immediately change. Even 12 hours later, the milk might not look much different. This is probably to be expected because that milk will have been produced in the hours immediately after injection. In any case, parenteral only treatment is common in many countries and seems to work well …

The OHS implications of administering intramamaries in beef cows are worth more than a cursory thought. There was an entertaining argument at the Alice Springs conference about whether Oxytetracycline should be the first choice for parenteral antibiotic in toxic mastitis. Oxytetracycline probably has a broader spectrum, but doesn’t get into the udder quite as well. If you don’t care about streps though, Trisoprim would be the winner for me …”

“We only treat mastitis in the beef cows as an acute, or chronic, event. Intramamaries don’t have much of a role in these situations, in our experience. We use Trisoprim injection, as well as Ketoprofen or Flunixin, and encourage frequent stripping of the affected quarter (or amputation of the teat, if gangrenous). For what it’s worth, we dispense Special Formula Forte V to be infused post-strip, though its value is doubtful; dispensing of it may help to encourage stripping. I was surprised to see that Jake Malmo’s text suggests Oxytetracycline to be capable of entering the udder. I’d thought the contrary. He does suggest that IV is a better route, and makes the same comment for TMS (so Trivetrin may be a better option, initially). I presume that follow up IM injections by owners will be adequate.”

“Most cases are either very acute with sepsicaemia and need intensive systemic treatment or chronic and treatment other than drainage if needed is pretty useless. For the in-between cases or for adjunctive therapy to systemic I have used cloxacillin. Generally I have used procaine penicillin for systemic therapy, although a tetracycline would also be high on my list if there was evidence of gram negative endotoxaemia. My use of procaine penicillin is not proposed to get into the mammary tissue, but to manage septicaemia – it seems to work for me over the years. By the stage I usually see beef cows, nothing is going to save the mammary gland!”

“I watch my beef herd fairly closely after calving (when still in paddocks close to yards), esp these last 2 very wet years, for individual swollen quarters that persist for a couple of days and are not just from calf preferring other teats, then get them in to check for mastitis. Usually send sample off to lab. The rest of the time it’s just checking for sick looking cows as an indicator that they may have mastitis that needs treating. If they get mastitis mid-lact and are not sick I don’t worry too much about it. Really sick cows usually get Mastalone i/mamm and Alamyacin 10 i/v for 3 days. Most of mine have been Strep uberis and some Staph. aureus. Used to use intramamm (Orb Lc) but really think IM is just as good and much safer for me, Have used Mamyzin regularly on its own but rather expensive. Lately been using Trisoprim with v. good results. I strip milk once a day for the 3 days of treatment, unless very fractious cow, as usually on my own treating them and am not as agile as I used to be! Also I may be less conscientious than used to be! Tend to recommend to my clients whatever I am using at home, if it’s working. If suspect coliform mastitis , they usually get a visit from me and the Mastalone/ Alamyacin treatment or just Trisoprim. I have a client at the moment who swears I/M Alamyacin 10 is working the best, without i/mamm, in his dairy herd. I was always led to believe it wasn’t best choice on its own as didn’t have good udder penetration from bloodstream!!”

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"I am very sceptical about using any parenteral antibiotic that doesn’t have a milk : plasma concentration ratio of at least 1. For this reason I never use procaine penicillin as a parenteral mastitis treatment. According to the countdown downunder technotes, procaine penicillin’s M:P ratio is only 0.15. In the UK there is an intra-mammary called Tetra Delta, which is basically Special Formula PLUS procaine penicillin. I can see merit of using procaine penicillin in an intramammary product like this because it removes the need to cross the "blood-milk barrier". My injectable mastitis options are: TMS (M:P= 3:1), Erythromycin/Tylosin (M:P= 2:1), Oxytet (M:P= 1:1), Penethamate (An ion-trapped beta-lactam), or IF in UK, NOT in Australia, IV fluoroquinolones in severe septic cases."

"We give 25 ml of Trisoprim to a 500kg cow, 33 ml to a 600 kg cow. The dose on the bottle suggests 10 – 15 ml/300 kg, so I guess we’re up there on the higher side. This has more to do with simple dispensing. If we’d given 25 mls at the visit, we can leave 3 day’s treatment. If we gave 33 ml, she might only get left another two day’s antibiotic. It just makes a neat 100 ml bottle. With the acute toxic mastitis cases we generally see, if the cow survives the first two days, she’ll probably make it. But, the dispensing regime is a bit slack! I reckon I’ll change to Trivetrin IV at the initial consult visit, having been reinspired by Jakob’s text; I used to give Trivetrin because IV looked more aggressive, rather than any real belief in better udder levels, but Trivetrin was a bit expensive (and the NSAID is given IV), so I just went for the simple Trisoprim (or Tribactral) IM. So, with that regime, we can either up the Trisoprim dose, or prolong the course, to make a 100 ml dispensing."

"From my experience, mastitis in the beef cows is a bit of an under-reported condition that many farmers simply fail to recognise. I find that they only seek vet advice when the cow is acutely sick, so with TMS, tolledine and IV hypertonic fluids if necessary, as well as ampicloic lC or cepravin lC. intramammary. I presume everyone has similar results to treatment, but I never cease to be amazed at how can manage to die in such creative ways. Last one of these I had a week ago decided to develop grass tetany as I was running the hypertonic saline into her. Dead within 2 minutes! One thing I advocate for my beef clients is to look at different ways of weaning their calves. Typically most farmers will yard wean up here in the autumn, and once the calves are drafted off, send the cows away onto a distant paddock with fresh feed. I much prefer to leave the cows and calves in a lane way for a few days before weaning to reduce milk yield, then lock the cows in the yards for 2 days on hay. The calves are put in a secure paddock onto fresh feed. Where we have done this, the calves don’t seem to get quite as big a set back and we get less weaner pneumonia and definitely less mastitis in the cows. In other words, we look to dry the cows off s well as weaning the calves. WHP is 28 days, which isn’t an issue seeing they’ve either got a baby calf to rear, or will need several months to pick up in condition, or repair the slough…. if they survive. And, on that subject, we give 25 litres or more of electrolyte by stomach tube (and funnel!) if the cow looks toxaaemic and unable to rise readily. We encourage frequent stripping of the affected quarter, even if the volume is small."

"I reckon fluid therapy is vital if the cow is down. I’ve not had much luck with hypertonic fluids – they act more like a slow acting euthanasia solution in my hands. Cows weigh about 500kg and are 8% blood, which is 40 litres. It’s pretty safe to give 15% blood volume quickly IV so I tend to pour about 5-6 litres of Hartmans into a garden spray unit and give that IV as quick as it will go (generally about 15 mins) along with Tolledine (because it lasts 48hrs) and TMS (because it gets in the udder, and should work on both Staphs and E. coli). It sometimes works."

With many thanks to the following people for sharing their wisdom and experiences. In no particular order: Alice Birks, Joanne Williams, Greg McIntyre, Dave Hall, Lee Taylor, Craig Dwyer, Luke Ingenhoff, Alan Guilfoyle, David Beggs, Chris Shirley.

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