The diagnosis of mastitis in the farrowing sow is often made erroneously in the mistaken belief that any problem with the udder after farrowing equals mastitis.

In reality, many "milking problems" are agalactia i.e. a failure of milk production and are not the result of infection of the udder. Systemic infection of the sow eg with PRRS virus can lead to agalactia but with no primary mastitis. Whilst the general perception is that mastitis is infectious, the true definition is simply that there is inflammation in the udder. This inflammation can result from infection, toxins or physical damage. In this paper, we will look at mastitis caused by infection in addition to the acute disease usually seen around farrowing. The chronic condition of Actinomycosis of the udder, which is seen at any stage of the cycle will also be discussed.

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Fig 1: The farrowing sow on woodchip bedding is vulnerable to acute toxic mastitis.

Fig 2: Death of the litter can result from milk loss due to acute mastitis.

Fig 3: Discrete lumps in the udder, indicative of dormant Actinomycosis.

Acute Mastitis

Clinical Signs

The clinical presentation of a true acute infectious mastitis is nearly always concentrated around or just after farrowing and the sow will be obviously ill - depressed, reluctant to rise or suckle, inappetant and will have a raised temperature. Great care must be taken in interpreting temperatures around farrowing as they are highly variable and can rise to 40°C (104°F) without any obvious abnormality from a more normal 38-9°C (c101°F). The truly acutely mastitic sow will have a temperature above this and up to 41.5°C. (107°F). (Note: the pigs normal body temperature is much higher than that of people which is typically 37°C/98.6°F)

The udder will be hard all over - not just at the edges - hot to touch, usually reddened and very painful - the sow reacting instantly to the touch. She is likely to lie on her belly to protect the teats but will occasionally lie laterally but fail to release any milk.

If it is possible to express milk from the teats, this may show an altered form - watery, clotted, discoloured and, in severe cases, even blood stained. The condition can be life threatening.

Obviously the litter will display signs of starvation as they fail to suck.

Causes

The causes of acute mastitis are usually bacterial and gain access to the udder via the teat as an ascending infection. The agents most commonly implicated are E coli, Klebiella and occasionally Pseudomonas, which are contaminants of the udder arising from the faeces or the environment. Thus, the hygiene of the pen and the overall conditions have a part to play. Warm, moist conditions favour penetration of the
teats and thus solid floor systems are more likely to be involved than fully slatted systems. Wood based bedding, such as sawdust or shavings, are particularly implicated - a parallel with peracute mastitis in housed dairy cows. Disease is possible but much less likely to occur on fully slatted floors.

Treatment
As an acutely toxic condition, treatment must be rapid and aggressive. The specific treatments given will need to be tailored to the farm by the attending veterinary surgeon but should include:

1) Antibiotics given at the correct dose and selected for their likely activity against the range of organisms implicated. Whilst laboratory testing and sensitivity patterns are useful in the longer term, the sow is likely be to dead before results are known in a single one off case. The treatment selected must have good penetration to the udder.

2) Anti-inflammatories e.g. ketoprofen, meloxicam which will reduce both the pain and inflammation but also the raised temperature. Cortisone is best avoided as it can reduce milk production.

3) Oxytocin. If milk flow can be established, the "poisoned" milk can be stripped out by hand.
An alternative approach would be to place older pigs close to weaning onto the sow in an attempt to get milk flowing but there are risks - the altered milk can trigger a scour in the piglets.

4) The sow must be encouraged to drink by regularly stimulating her to rise.

Consequences
In some cases, death will occur despite treatment. Often the best that can be achieved is survival but complete drying off with the obvious need to foster the litter elsewhere. If the sow is to be retained for re-breeding - which is unwise - she should not be re-served for at least 3 weeks after farrowing - it is necessary to skip the first heat.

Control
Hygiene is the key. Washing and disinfection of farrowing pens is a standard requirement but the pen must be dry prior to entry and it is best to avoid allowing disinfectant to dry on the floors. In its concentrated form it can damage the teat and make it more prone to ascending infection. This is particularly true of phenolic disinfectants. Always ensure that disinfectants are cleared from water troughs before sows are crated to avoid them drinking what are potentially highly toxic chemicals. Similarly, if lime washing is undertaken, ensure it is fully cured (minimum 4 days) before re-stocking.

If acute mastitis is recognised as a significant problem on the farm, avoid the use of wood based bedding around the farrowing period. Chopped straw or shredded paper are preferable.

Washing sows on entry to the farrowing crate can be beneficial but only if they are allowed to dry thoroughly before crating - a technique that usually requires a clean straw based holding area in which sows can dry off.

Chronic Mastitis
Hardened lumps in the udder tissue, especially in the rear half of the udder, are commonly seen in sows and are termed 'Actinomyces' or lumpy udder. Actinomyces suis is the most common cause but other bacteria may be implicated.

Discrete swellings are usually first seen after weaning and in the first month after service and appear to be associated with damage and fight wounds to the udder. The condition appears to be more common in sows housed on straw than on slats and may be a feature of the heavy levels of contamination that occur in the weaned sow pen.

Alternatively the infectious agent may penetrate the udder during the previous lactation as a result of teeth damage but only becomes apparent once the milk producing tissue atrophies after weaning. The initial swelling is hard and painless and there is no systemic illness.

In some cases the hardened lump remains dormant and is of little consequence, although there is probably a reduction in milk production for the affected glands. As the sow approaches her next farrowing the lesions can become active, increasing in size and ulcerating such that purulent material exudes from the ulcer. The udder can become so enlarged that it drags on ground. When weaned, it will be prone to further damage and contamination.

Treatments
The key to controlling chronic mastitis is dealing with the initial lesions. Once the lesion becomes enlarged, cure is impossible and the best that can be hoped for is healing of the ulcer, shrinkage of the swelling and premature culling.

Efforts are needed during suckling and at weaning to reduce udder injury and contamination. Weaning into smaller groups with additional floor space (4m²/sow) will help, as will regular cleaning and disinfection of the weaning pen. In persistent problem herds, medication of sows around weaning, either by in feed or long acting injectable antibiotics may be prescribed to prevent seeding of infection.

Teeth reduction by grinding or clipping of pigs in the first 24 hours after birth may be appropriate under veterinary instruction (It is illegal to undertake this
Once lesions have developed they will persist. Sows with swellings that are larger than a small melon, and any ulcerated lesions, are not appropriate for routine culling - transportation and slaughter - and often require on farm euthanasia, contributing to herd mortality. On no account should such animals be presented at market.

**Costs**
The costs of mastitis arise from treatment, loss of production and death/premature culling.

For acute disease a course of treatment including anti-inflammatory therapy will exceed £10 per case. Where the sow survives, the udder will often dry up and the challenge will be to cross-foster and rear the litter. Where disease occurs around farrowing, colostrum production and intake will be compromised and loss of the litter can result, at a value of £4-£500.

Death of the sow with disposal costs will exceed £150 - a similar cost for on-farm euthanasia of chronic Actinomycosis.

In high-risk situations, anti-microbial costs can be £2-£3/sow to prevent chronic disease - in excess of £5/sow/year.