Urogentital Infections in Sows and Gilts; Differential Diagnosis, Diagnostic Techniques and Control

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Introduction

Urogenital infections and vaginal discharge are common complaints of swine producers and breeding herd managers. This is an area of great concern, not only for producers but also for swine veterinarians. This syndrome has been on the increase in recent years and is associated with intensive management of swine. Some of the manifestations of this syndrome are reproductive failure, poor performance, inappetence, and underconditioned sows.² This is a source of great economic loss to the producer as reproductive efficiency is one of the most accurate predictors of swine enterprise profitability. Even so published information on this syndrome has only been available in recent years and is anything but plentiful.

Clinical Signs

Because urogenital infections may involve one or more of several different organs the presentation may be quite variable. However the usual client complaint is vaginal discharge. The discharge is usually seen as a dried deposit in the perineal region or as a puddle on the floor. Discharges may be noted post-breeding, postparturient, or unassociated with a stage of reproduction. The nature, volume, and frequency of the discharge may be important in determining the source of the infection. Affected sows will often have a low grade fever, be inappetent and may even lose condition if the infection is severe and of long duration.

#Not in pig are those animals which are diagnosed nonpregnant early in the gestation period.

Fail to farrow are those animals diagnosed pregnant early in gestation but never pig

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**Dr. Riese is an assistant professor of clinical sciences in the College of Veterinary Medicine at Iowa State University. The clients complaint may be reproductive manifestations of urogenital infections especially if accurate records are kept within the unit. Increased numbers of repeat breeders, an increase in the weaning to estrus interval, an increase in the number of abortions, or an increase in the numbers of not in pig#and fail to farrow## sows are all possible.¹ The ultimate reproductive manifestations of these problems are an increased farrowing interval, prolonged farrowings and a decrease in the number of litters per sow per year.¹¹ These reproductive problems have a direct influence on the number of pigs per sow per year and the profitability of the swine unit.

In one study of endometritis in a group of gilts, the economic aspects of this infection were assessed.9 In this study, 13.8% of the gilts were affected. This infection rate is severe but not uncommon in herds with a problem. Only 55% of the affected gilts became pregnant while gilts that were unaffected had a conception rate of 90%. The affected gilts that did settle required an average of 1.85 services per conception while gilts on the same farm that showed no signs of infection required only 1.12 services per conception. The cost of this infection at various levels of production and the break-even treatment cost are summarized in the following table. For instance if a producer farrowed 2.05 times per year, selected 60 replacement gilts, and had a ten percent infection rate, the cost per gilt would be \$87.00 with a total cost for sixty gilts being \$522.00.

Predisposing Factors

There are at least ten different factors that predispose sows to urogenital infections. These factors can be classified as relating to environment, management, or the animal itself. Consideration of a discharge problem in these three categories may help the practitioner locate the problem and make recommendations to solve it.

In the area of housing and environment there are two basic areas that need to be assessed. The first is restricted movement which results in decreased water intake and less frequent urination. This would indicate that sows housed in tether barns or gestation stalls would have an increased rate of urogenital infections.¹² This is, in fact, the case. Sows housed in tether barns have the highest rates of infection followed by sows in gestation stalls and sows in pens with solid floors and gutters have higher rates of infection than sows housed in pens with slatted floors.² The second basic area of housing and environment that predispose sows to urogenital infections is humidity. High humidity in a building results in accumulation of urine and moisture on the floor. This brings about a higher rate of urogenital infections than is seen in buildings with acceptable humidity levels.² The humidity in a swine facility is controlled by the ventilation system and the design and maintenance of the ventilation system are just is important as the ventilation rate in the control of humidity.

The management of a breeding herd can have a large role in the prevalence of urogenital infections in the sow. Poor hygiene is probably the most important factor that predispose sows to these infections. The floors of the breeding area and farrowing stalls should be clean. Perineal contamination by fecal material causes more urogenital infections than any other single factor.³ This accumulation of manure may be related to the design of the floor but more often is due to inadequate waste removal and improper cleaning of the perineum before breeding and farrowing. The second management related problem is assistance, by farm personnel, during farrowing and breeding.² Swine unit workers often have fecally contaminated hands. When they assist the boar, perform artificial insemination, or intervene in the farrowing house this contamination can easily find its way into the genital tract of the sow. Washing hands, use of gloves, and cleaning artificial insemination equipment between sows will reduce this problem.

There are multiple factors associated with the animals themselves predisposing them to urogenital infections. The boar may mechanically carry organisms from one sow to the next.¹² Some organisms such as *Corynebacterium suis* will colonize the preputial diverticulum of boars.¹⁴ The reproductive state of the female is important as well. Infections are common in post-weaning, post-farrowing, and cyclic gilts and rare in prepubertal gilts, lactating sows, and pregnant sows.² Advanced parity sows have more problems with urogenital infections than lower parity animals.³ Prolonged or difficult farrowing will tend to cause an increase in the number of infections.² In abortion due to placentatropic or feticidal agents the autolyzing fetus or placenta provides an excellent growth media for the bacteria that cause urogenital infections.^{2,12}

Pathogenesis

Most urogenital infections ascend from the vagina. Noncycling, nonpregnant animals are relatively resistant to infection due to a tightly closed cervix.² The uterus of the sow is relatively resistant to infection at the time of estrus due to increased levels of IgG and IgA and increased activity of phagocytic cells under the influence of estrogen.² The cervix is, however, open at this time and may allow a large bacterial load access to the uterus. Natural resistance to infection is decreased during the luteal phase when the uterus is under the influence of progesterone and bacteria often colonize at this time. The urinary tract is also relatively resistant to infection but trauma during mating, artificial insemination, or parturition may allow an infection to begin.¹⁷ Urine stasis will also reduce the resistance of the urinary tract.

Differential Diagnosis

The first major consideration in the differential diagnosis of urogenital infections of swine is the determination of the origin of the discharge. Discharges may result from the vulva, vagina, cervix, uterus, bladder, or renal pelvis.³ Location can often be determined by observing the nature, amount and frequency of discharge, and stage of reproductive cycle.

The second major consideration in the differential diagnosis of urogenital infections in swine is the agent or agents that are involved. A number of bacteria have been isolated from urogenital infections. Some of these bacteria are primary pathogens but a large number are opportunists. Apathogenic bacteria that have been isolated from the urogenital tract of sows and gilts include: *Streptococcus* spp., *Citro*- bacter, Escherichia coli, Corynebacterium spp., and Staphylococcus spp 24

Pathogenic isolates include: Proteus, Escherichia coli, Klebsiella, Streptococci, Corynebacterium pyogenes, Corynebacterium suis, Pseudomonas aeruginosa, Pasteurella multocida, Staphylococcus aureus, Actinobacillus, Mycobacterium avium, and Ureaplasma.²⁴

Other agents may cause a vaginal discharge in swine. These may be viral, fungal, or parasitic. Pseudorabies virus will cause an ulcerative endometritis when inoculated into the uterus of sows.²⁴ This often results in a purulent discharge and is probably responsible for the decreased fertility that is observed during acute pseudorabies outbreaks.²⁴ Stephanurus dentatus, the swine kidney worm, is a fairly common problem in the southeastern United States. Estrogenic mycotoxins such as, zearalanone, have the potential to cause vulvar swelling and vaginal discharge.

Pathology

Some important pathological findings associated with these diseases. Pyogenic oophoritis may on very rare occasions result in a vaginal discharge. This is usually an ascending infection and *Corynebacterium Pyogenes* is a common isolate.²⁴ Adhesions are quite common and may result in permanent infertility.¹

Endometritis is a much more common cause of vaginal discharge and usually results from an ascending bacterial infection. Virtually any of the bacteria mentioned in the previous section can be isolated from a case of endometritis. Endometritis usually occurs in cycling sows or gilts or in postpartum sows. In acute cases of endometritis, the most striking pathological finding is the accumulation of purulent exudate in the lumen of the uterus.²⁵ As the infection becomes more chronic, fibrosis, ulceration, and abscessation are common pathological findings.²⁵ There may also be an associated peritonitis as the infection ascends through the oviducts.²⁵ The fertility of sows with an acute endometritis may return if the infection is resolved. As the infection becomes more chronic, however, the sows fertility may be seriously compromised.

Vaginitis and cervicitis are also associated with a vaginal discharge. This is usually due to an ascending infection and is common in animals that have been recently mated or farrowed. The normal vagina has a decreasing bacterial gradient from caudad to craniad.²⁴ The pathological appearance of vaginitis is a purulent exudate with fibrin tags and hemorrhage.²⁵ The organisms that are associated with vaginitis are many and mixed infections are common. Vaginitis alone will usually not interfere with the fertility of the sow, but the infection may ascend into the uterus where the potential for infertility is much higher.

Cystitis and pyelonephritis are usually associated with an ascending infection and urine stasis. The appearance of cystitis usually consists of hyperemia, mucosal ulceration, and fibrinopurulent exudate.²⁵ As the cystitis becomes more chronic a thickened fibrotic bladder wall is a common pathological finding.²⁵ The bladder infection may then ascend causing ureteritis and pyelonephritis. Pyelonephritis is characterized by wedge shaped yellow tracts that extend from the kidney pelvis to the cortex, and by fibrinopurulent exudate.²⁵ Organisms that have been associated with pyelonephritis and cystitis include: *Streptococcus spp.*, *Proteus spp.*, *Corynebacterium suis*. and coliforms.²⁴

Diagnostic Techniques

Because urogenital infections are a complex herd problem and more of a syndrome rather than a specific disease, a thorough diagnostic workup is essential.

First the diagnostician must get a complete history and review herd records. These records will help determine where in the reproductive cycle the disease is occurring, which building is involved, whether certain boars are consistently involved, whether certain attendants (either at mating or farrowing) are consistently involved, the age of the animals involved, and the general health of the animals on the farm.

An antemortem examination of all discharging animals should then be completed. This examination should include both a general physical examination and a detailed examination of the reproductive tract. Attitude, appetite, and body condition should be evaluated and the perineal region examined for exudate. Examination of the reproductive tract should include vaginoscopy, urinalysis, transvaginal swabs, and pregnancy determination. Boars ought to be examined and a preputial swab taken.

A postmortem examination or slaughter

check may also be useful in the diagnosis of a urogenital infection problem. Gross examination of the bladder, renal pelvis, uterus, and vagina is important. The ovaries should also be examined to determine if the sow is cyclic and what stage of the cycle she is in. Specimens for bacteriological culture and histopathology can also be obtained at this time.

Treatment and Control

Important factors for the practitioner to consider when presented with a herd problem of vaginal discharge is herd incidence and when to intervene. As a rule vaginal discharge will present as a sporadic problem in individual sows.² In some herds vaginal discharge is a significant problem that will require veterinary intervention. A discharge rate of less than 2% should be expected in both pregnant and day 5 postpartum sows.² A discharge rate of 3% or greater should be considered abnormal and veterinary intervention is probably justified.¹⁹

Once the veterinarian and producer decide to proceed with treatment the results are usually frustrating at best. Because of the anatomy of the sow's cervix and the limitations of rectal manipulation intrauterine therapy is not practical. The exception to this might be in the estrous sow. Parenteral and oral antibiotics can be used, but this is expensive and not always efficacious. Some of the antimicrobials that have been used include penicillin, tetracycline, sulfonamides, and potentiated sulfonamides.¹⁵ The use of antimicrobials in the feed as a prophylactic measure may decrease the incidence of infection, but could present residue problems in culled sows. Another possibility is antimicrobial infusions into the prepuce of boars.24 Commercially available intramammary infusion syringes work well for this and boars should be treated quarterly.²⁴ Prevention rather than treatment is the control method of choice.

In order to prevent urogenital infections in sows a thorough review of management practices on the farm should be obtained. Obvious managerial problems can then be pointed out and eliminated. Other recommendations that the veterinarian might want to make include: cull all discharging sows that return to estrus or are nonpregnant and any sows that are 6-7 parity or more, mate each sow to only one boar, use only clean boars on gilts, clean the entire breeding and early gestation areas once a week, increase lactation length if possible to allow postpartum infections to clear, and additions to the breeding herd should be obtained from herds with no history of urogenital infections.³

Summary

Urogenital infections are one of the nagging problems that the swine producer and veterinarian must deal with. It is a complex problem with no easy answers about cause or control. It is a problem that gains severity as more sows are put into controlled housing. Prevention rather than treatment is the key. Communication between the veterinarian and unit personnel is the key to prevention. As with many of the confinement associated diseases of swine, urogenital infections are diseases of man that manifest themselves in the pig.

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