**مركز تدريب الاطباء البيطرين بسرس الليان**

**محاضرة تحت عنوان**

**جراحات الجهاز البولي التناسلي في المجترات و الخيول**

1. **Surgical Management of Urogenital Affections in Large Ruminants**
2. **Surgical Management of Urogenital Affections in Equine**

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**UROLITHIASIS**

**(Urinary calculi and their sequel)**

Urolithiasis means the formation of calculi from soluble crystalloids of the urine as a result of multiple congenital and or acquired physiological and pathological processes. If such crystalloids became trapped in the urinary system, they might grow to a sufficient size to cause clinical signs.

Urolithiasis is considered to be a relatively common syndrome in male ruminants. It constitutes one of the problems facing fattening animal industry and deserves serious consideration. If not promptly treated animals harbouring calculi may develop a fatal obstructive urolithiasis.

**Aetiology:** Urolithiasis is a multifactor syndrome as it is not a simple entity but it is an interplay of many factors. The disturbance of minerals metabolism plays an important role in the induction of this problem. So, most of the authors reflected the problem as a dietetic one.

The high level of dietary phosphorus resulted in significantly high serum and urine phosphorus value leading to high urinary calculi incidence. The high urinary phosphorus was suggested to cause renal tubular damage, which lead to increase protein excretion increasing the chance for calculi formation.

It was found that the high dietary calcium level resulted in lowering serum and urine phosphorus value and consequently lower the urinary calculi incidence. On the other hand, the addition of sodium bicarbonate to low or high phosphorus diet increased the incidence of calculi formation.

Elevated dietary magnesium was a cause of urolithiasis in growing calves. However the addition of calcium appeared to protect calves against urolithiasis induced by elevated magnesium.

The addition of potassium to the diet also resulted in high incidence of urinary calculi formation in sheep.

Feeding ration of a high concentrate (as maize grains) for fattening showed ruminal acidosis. It was accompanied with degree of

hypocalcemia and hyperphosphatemia that disturbed the Ca : P ratio thus playing a direct role in the pathogenesis of urolithiasis.

The higher incidence of urinary calculi in summer season would be due to insufficient carotenes intake (the source of Vitamin. A) or heavy fluid loss that accompanied by concentration of urinary salts giving chance for formation of urinary calculi.

The hard water or the water with excessive insoluble salts was directly correlated with urolithiasis incidence.

The pH of urine affects the solubility of some salts mixed with phosphate and carbonate calculi being more formed in alkaline than acidic medium.

**Predominate type of urinary calculi:**

The most common urinary calculi encountered in dogs were magnesium and ammonium phosphate, ammonium urate and calcium oxalate.

The major chemical compounds of stones collected from urethra and bladder of cattle were carbonates of calcium and magnesium with small amount of phosphates. The siliceous type mainly occurs in animals fed on ration in which the silica was a principle.

The primary component of most equine uroliths is some form of calcium carbonate, but they may also include calcium oxalate, magnesium, ammonium and phosphate.

**Anatomical predisposition for urolithiasis:**

The most common site of urethral obstruction in male ruminants was the sigmoid flexure of penis in bulls, bucks and rams as well as the urethral process in both bucks and rams. In dogs, urinary calculi frequently lodged at the level of the os penis

**Clinical signs:**

The first clinical sign of either partial or complete occlusion is either dysuria or anuria manifested by abdominal discomfort with colic. The animal become restless, strains, kicks at the belly and makes frequent attempts to urinate. Trials to urinate were always unsuccessful and the animal took the posture of urination with arched back. Hematuria was sometimes present. In steers the tail is elevated and pulsation of the urethra just ventral to the rectum is frequently observed. Manual palpation revealed overfilled bladder. In bucks and rams examination of the glans penis showed either adhered urethral process or presence of concernments inside.

Urethral occlusion leads either to rupture of urethra, where the urine infiltrates the subcutaneous tissue leading to considerable enlargement of the ventral abdominal wall or to rupture of the bladder, where the urine accumulated within the abdominal cavity. In such instance the abdomen was distended and showing percussion waves indicating the presence of fluid. The abdominal pain is no longer noted and the animal may appears nearly normal for several days. The bladder could not be felt on rectal examination.

Absence of urethral pulsation was not diagnostic since it was not detected in some cases of intact bladder. The general symptoms of ruptured bladder include tachycardia with hurried shallow respiration and slightly congested mucous membrane. Toxaemia and uraemia progress as the abdominal filling continues.

**Treatment:**

Therapy for urolithiasis encompasses: (1) surgical or non-surgical relive of obstruction to urine outflow when necessary, (2) elimination of existing calculi, (3) eradication or control of predisposing causes, (4) eradication or control of urinary tract infections, and (5) prevention of recurrence of urolithiasis.

The objectives of medical management of uroliths are to arrest further urolith growth or promote urolith dissolution. For therapy to be effective it must induce under saturation of urine with calculogenic crystalloids by: (1) increasing the solubility of crystalloids in urine (by change the pH of urine), (2) increasing the volume of urine in which crystalloids are dissolved or suspended (by induction of diuresis), (3) reducing the quantity of calculogenic crystalloids in urine (by the changes in the diet). The injection of atropine sulphae subcutaneously in a dose of one mg for sheep and goat or 5 mg for calves, as well as the I.M. injection of tranquilizer (largactil) in dose ranging from 25-50 mg for sheep and goat, might induce urination within 30-45 minutes after injection. The urination was either spontaneously or with the aid of manual pressure.

Catheterization under the effect of tranquilizer in dogs, cats, stallions, donkeys is possible but in rams, kids and bovines, the presence of the S-shaped flexure renders the catheterization in these animals impracticable.

If there was no improvement one hour post medical treatment, amputation (snip off) of the urethral process in sheep and goat was indicated. It is a simple surgical interference and was performed without use of special anaesthesia.

If the animal did not show improvement after amputation of the urethral process, a perineal urethrotomy was indicated. The operation was done under the effect of epidural anaesthesia (4-6 ml in sheep and goat, and 8-10 ml in large animals, of 2% procaine HCl).

Perineal urethrostomy was performed alone or in conjunction with

cystotomy.

In cases of ruptured bladder a para median laparotomy cranial to the pubic bone was performed. The abdominal cavity was gradually and carefully evacuated from the fluid inside. The urinary bladder was exposed outside the wound and washed with saline. A catheter was passed through the neck of the bladder into the urethra to flush it with normal saline to ensure the free passage. If there was any obstruction, a perineal urethrotomy or penis amputation should be done. Then, the ruptured bladder was sutured with double rows of Lembert suture. This was followed by intra-abdominal antibiotic application and the abdominal wound was closed as usual. If there is cystic calculi, cystotomy was performed via-median skin incision adjacent to the penis starting from the level of the inguinal ring and extending to the umbilicus. The penis and prepuce were reflected and the abdomen was opened through linea alba. The bladder were examined and packed off from the abdominal cavity. It was stabilized and elevated by two stay sutures. A 4-5 cm full thickness incision was made at the apex or dorsum of the bladder where the urine and the cystic calculi were suctioned from it. The present calculi were flushed from the urethra retrogradly and

normogradly with normal sterile saline. In some cases perineal urethrostomy was performed and the retrograde catheter was inserted through the urethra.

In other cases, the penis was exteriorized, and the catheter was introduced into the distal opening of the urethra. Finally the bladder and labarotomy incisions were closed as usual.

**URETHROSTOMY**

**A urethrostomy is the creation of a new and permanent artificialurethral orifice: It can be performed through:-**

**1- Ischial approach:**

The operation is performed in the standing position of the animal.

Anaesthesia for the operation is by posterior epidural or by localinfiltration of the subcutaneous tissue at the median raphe at the level of ischial arch (8-10 cm below the anus).

The skin and subcutaneous tissue are incised for 20 cm downward from the tuber ischii.

Blunt and sharp dissection is carried down until the penis is identified. Care should be taken not to mistake the retractor muscles from the penis itself.

The penis should be isolated and pulled outward through the skin incision.

The penis is then severed at the lower end of the skin incision, making certain the proximal stump is long enough to protrude for 3 cm outside the skin incision.

Several techniques are used to fasten the proximal stump of the penis to the skin to prevent urine from infiltrating the tissue deeper than the skin.

The urethra lies on the dorsal surface of the penis as the stump is brought outside the incision of the skin. A simple method is to place a suture through the skin of one side of the incision, and then transfixes the body of the penis, and then suture is brought the skin of the opposite side of the incision.

The suture should be tied below the protruded portion of the penis so that the urethra is not legated.

**The advantages of this approach are:**

1- Can be performed in the standing position.

3- The technique is relatively simple.

The disadvantages of this approach are:

1- In fat or large animals the penis is deeply covered by fat and muscle making it difficult to identify.

2- Urination soils the tail and perineal region leads to ―urine scald‖.

3- Sudden abrupt bend of the proximal stump leads to partial or complete obstruction of the urethra.

**2- Base of the scrotum approach:**

The operation is performed in the standing or recumbent position and anaesthesia is best accomplished by local infiltration.

The skin incision is made over the median raphe beginning just above the base of the scrotum and extending upward 15 cm.

The penis is isolated by blunt dissection and manually pulled through the tissues out through the skin incision.

Straightening the sigmoid flexure by traction allows a considerable portion of the penis to be exteriorized.

The penis is severed at the proximal end of the sigmoid flexure and then fixed to the skin in the same fashion as in the ischeal approach.

**Advantage of this approach:**

1- The penis is easily isolated and more readily accessible.

2- The penis and urethra are not bent or displaced.

3- The animal urinates downward.

**3- Perineal Urethrotomy:**

In large animals, the operation is carried out in the perineal region 8- cm below the anus and under the control of posterior epidural anaesthesia.

In male dogs, the operation is done just caudal to the os penis.

Urethral fistulation, urethrotomy, is exactly done in the midline where a skin incision is made with a scalpel and the loose connective tissue of the sub cutis is severed bluntly with scissors or forceps until deep down in the wound. The penis is then palpated as a strand in the thickness of a thumb. This is grasped with the fingers and pulled out into the wound. It is then cleared from the surrounding connective tissue until the wall of the urethra becomes exposed. It must then be incised in the midline.

The patency of the urethra is tested in both directions by means of a pliable catheter. If the obstructive calculus was removed, the opened urethra was sutured again. In cases where the obstruction is still persisted distally and far away from the urethral incision the urethral mucosa is then reflected and sutured to the skin to form an artificial opening (the urethrotomy opening or fistula). The animal can urinate from the said fistula for a time quite enough for fattening.

**Perineal Laceration in Mare**

Perineal lacerations in horses are the result of foaling injuries.

There are three levels of perineal laceration:

1- **First Degree**:

- Damage to skin and mucous membrane of the dorsal aspect of the vestibule only.

- Treatment: it is usually self- limiting and do not require surgery other than possibly a Caslick,s operation

- Vulval lacerations should be repaired immediately.

2- **Second Degree:**

- Damage to skin, mucous membrane and musculature of the constrictor vulvae muscle and perineal body, compromising the ability of these muscles to constrict the vestibule.

- Disruption of the musculature causes the perineum to sink cranially and ventrally, predisposing the mare to pneumovagina and urine pooling.

- Treatment: The wound should be surgically repaired after the formation of granulation tissue.

- Some Second Degree injures are simply required Caslick,s operation, but others requires further perineal body reconstruction.

3- **Third Degree**: perineal laceration, or rectovestibular lacerations.

**Third degree perineal laceration or rectovestibular laceration**

Complete perforation of the vaginal wall and rectum producing a single opening to the rectum and vagina.

**Causes:**

A. It occurs predominately in in primiparous mares than pluriparous

B. The annular fold of the hymen of primiparous mares is more prominent than that of pluriparous animals.

C. The strong abdominal pressure that ensures the delivery of the foal forces complete disruption of the roof of the vestibule.

Mares with a third-degree perineal injury need more preoperative preparation and more postoperative care than do mares with a first-degree or second-degree perineal laceration because the rectum is involved in the injury.

**Preoperative preparation:**

a) Before the mare is prepared for surgery, the reproductive tract should be examined per vaginum, uterine adhesions, filling of the uterus with manure, or pyometra.

b) Surprisingly, although fecal contamination of the vagina and adjacent structures is constant, the uterus is unlikely to be permanently damaged, provided that surgical repair is performed in an effective and timely manner.

c) A major factor that affects the outcome of the surgery is softness and bulk of the mare's stool. The stool must remain soft and unformed to minimize stress on the healing tissues during defecation.

d) Simply allowing the mare to graze lush 3 weeks before operation, green pasture may be all that is necessary to keep the stool soft. If lush pasture is not available, the mare should receive a diet of alfalfa pellets (beginning several days before surgery) to decrease the bulk of the stool, plus administration of a stool softener before surgery and for at least 10 days after surgery. The diet of pellets should be fed in amounts sufficient to allow the mare to maintain body weight.

Administration of 2 to 4 L of mineral oil via nasogastric intubation for 1 to 2 days before surgery generally ensures that the stool is soft and pliable at surgery.

e) Administration of several ounces of raw linseed oil once or twice daily in the feed is another effective method of softening the stool. A broad-spectrum antimicrobial drug should be administered within several hours before surgery.

**Surgery:**

A third-degree perineal injury can be repaired with the mare sedated and standing, after the perineal region is desensitized with epidural analgesia. Most surgeons perform the surgery with the mare standing.

**A. The two stages of reconstruction** (Anes technique) —

rectovestibular reconstruction and anoperineal reconstruction—can be performed during the same operation, or anoperineal reconstruction can be completed 3 to 4 weeks or more after rectovestibular reconstruction. Less stress is placed on the reconstructed rectovestibular tissue during defecation if anoperineal reconstruction is postponed until the reconstructed rectovestibular tissue has healed. However, performance of both stages of reconstruction during the same operation minimizes expense and time needed for recovery.

**Preparation during surgery**

- For preparation for repair of the rectovestibular laceration, the tail is wrapped and tied dorsally, and the rectum is emptied of feces as far as the operator can reach.

- A tampon, can be placed in the rectum cranial to the defect to prevent feces from contaminating the surgical site during repair, but the presence of a rectal tampon may cause some mares to strain.

- The vagina, vestibule, and rectum are cleaned with cotton soaked in dilute povidone-iodine solution, and the perineal area is scrubbed with a disinfectant soap.

- The laceration is exposed by suturing or clamping (with Allis tissue forceps) the dorsal aspect of each labium and the ventrolateral aspect of the right and left sides of the anus to the skin adjacent to the perineal body.

- Long surgical instruments are helpful in rectovestibular reconstruction. To reconstruct the rectovestibular tissue, the submucosa between the ventral aspect of the rectum and the dorsal aspect of the vagina (at the cranial border of the laceration) is split cranially in a transverse plane with scissors for 5 to 10 cm.

- Dissection is continued with a scalpel caudolaterally along the right and left walls of the common vault of the rectum and vestibule, to the point at which the labia normally should join at the dorsal commissure of the vulva.

- Then, with scissors, the incision along each wall of the vestibule is deepened dorsolaterally to form right and left flaps. The flaps are used to recreate both the ventral aspect of the rectum and the dorsal aspect of the vestibule.

- Dissection is continued until right and left flaps can be opposed without significant tension. At this point in the surgery, several techniques can be used to reconstruct the rectum and vestibule.

**B. Single Stage Repair**: Using the Goetze modification of the single stage repair, two tissue shelves is created, with the rectal tissue had made thicker than the vestibular flap. Dissection is performed as discussed before. Suture closure is carried out using a six-bite suture pattern, with the knots being hand tied in the vestibule. Absorbable

noncapillary suture material on a large half-circle needle is used to appose the tissue flaps.

- Tissue bites are taken consecutively in the left vestibular flap well back from the incised margin, the left rectal submucosa to emerge near the rectal mucosa, the right rectal submucosa, and deep in the right vestibular flap.

- The last two bites are shallow bites in the right and left vestibular flaps respectively. When tightened, these sutures should snugly appose rectal mucosa and evert vestibular mucosa into the vestibule.

This pattern is continued to within 4 to 6 cm of the cutaneous perineum, at which time dissection to expose the remainder of the tissues of the triangular perineal body is completed.

- Closure of this dissection is completed using a combination of the sixbite technique and individually placed interrupted sutures in the deeper tissues of the perineal body. If necessary, a Caslick operation is also completed.

Treatment of third degree perineal laceration is always surgical and the aim is to restore normal anatomy. If the foaling injury is less than 3 hours old, immediate repair can be considered but is rarely performed.

Uterine and vaginal washing 4 times is performed to eliminate and control infections.

There is usually extensive bruising and laceration therefore repair should be delayed until bruising has subsided and granulation tissue has formed, usually a minimum of 6–8 weeks after foaling.

There are two techniques for repair of a third degree perineal laceration:

1. **The Aanes Technique** is a two-stage repair technique:

a) **Stage 1** is the reconstruction of the recto-vestibular shelf (the perineal body is left open).

b) **Stage 2** involves the closure of the perineal body 3–4 weeks later.

2. **The Goetze technique** is a one-stage operation that involves everting the rectal mucosa into the rectum and vaginal mucosa into the vagina using six bite stitches.

**Castration**

**Castration means ablation of the testicles**

**Indication:**

1. Castrated animals become docile and tractable.

2. Male animals whose flesh is used for human consumption are universally castrated animals develop better and fatten more easily and quickly and the flesh is of better quality.

3. In sheep the wool produced by the castrated male is considered to be of finer quality.

4. Also the chief objects of castration in rams is the improvement of breeds by castration of the undesirable individuals.

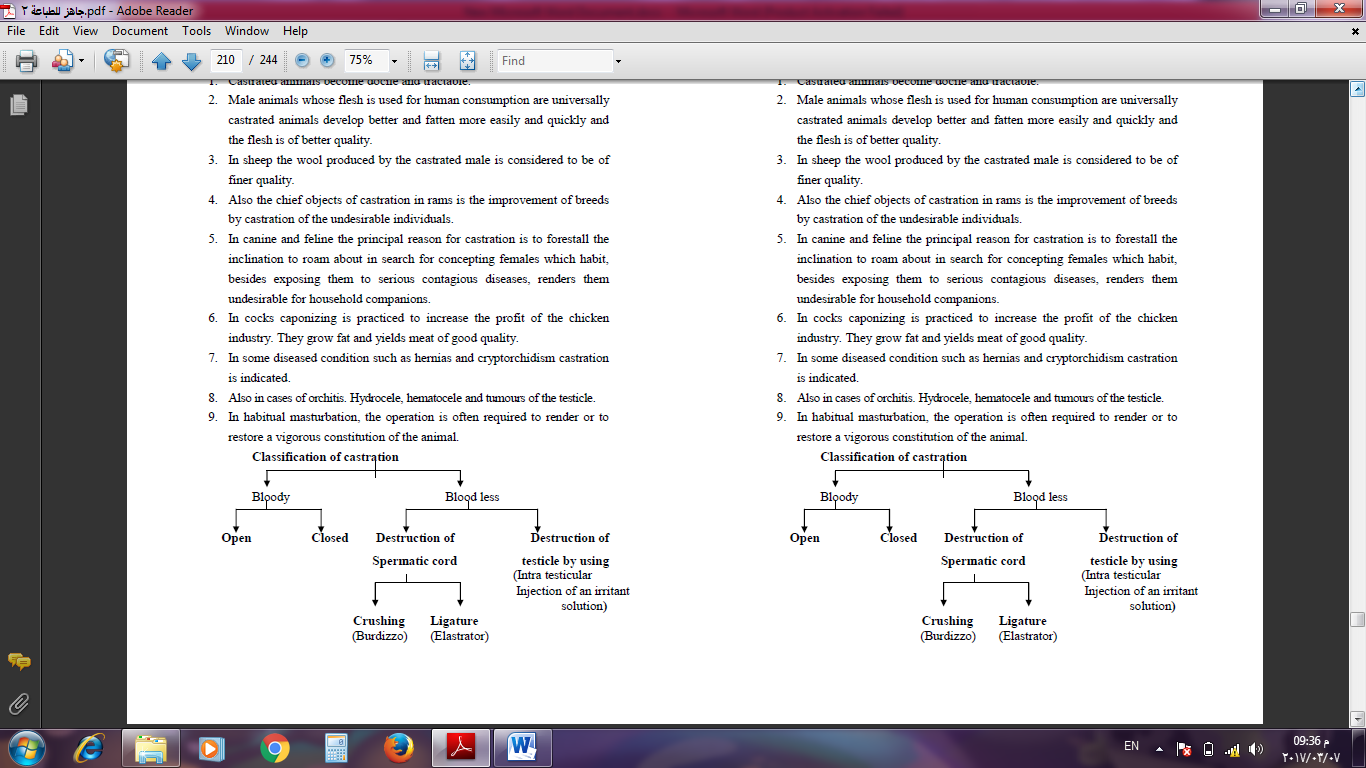
5. In canine and feline the principal reason for castration is to forestall the inclination to roam about in search for concepting females which habit, besides exposing them to serious contagious diseases, renders them undesirable for household companions.

6. In cocks caponizing is practiced to increase the profit of the chicken industry. They grow fat and yields meat of good quality.

7. In some diseased condition such as hernias and cryptorchidism castration is indicated.

8. Also in cases of orchitis. Hydrocele, hematocele and tumours of the testicle.

9. In habitual masturbation, the operation is often required to render or to restore a vigorous constitution of the animal.



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Castration in bull

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|  | Castration in dog |

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**Ovariectomy (Spaying) in Bitch and Cat**

**Indication**:

- Ovarian neoplasm‘s and cysts.

- To prevent pregnancy.

**Anaesthesia**:

Under the influence of general anaesthesia or epidural one.

**Technique**:

The operation is done as for laparotomy on the dorsal recumbency on the white line or slightly para-median immediately behind the umbilicus.

 Introduce the middle finger into the abdomen and direct it backwards seeking for the uterine horn or the corpus uteri. One can introduce the first finger and the thumb into the abdomen and search for the ovary immediately behind the posterior extremity of the corresponding kidney.

 Hold the ovary with an artery forceps.

 Legate the ovarian artery with chromic catgut No. 0 and the uterine artery behind the ovary in the broad ligament then excise the ovary by means of a scissor. Repeat the same steps with the other ovary.

 Close the laparotomy wound as usual.

**Complications**:

Internal haemorrhage – Peritonitis – Hernia or shock.