

TO THE POINT CLASS LECTURES

REGIONAL SURGERY
(SURG 402)

MID COMPLETE

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Delivered by:

Dr. Misbah Ejaz

Department of Clinical Medicine & Surgery
Faculty of Veterinary Science
University of Agriculture
Faisalabad

Presented by:

MUHAMMAD SAJJAD HUSSAIN

vetspace.tk

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For Suggestions & Feedback: Contact: 0322 6272 278 Email: dvmdoctors@gmail.com

WOUND

Definition:- Any break in the continuity of the tissue or skin due to any reason e.g. by trauma.

Classification of Wounds

Broadly we can classify the wounds into two major categories as follows;

- i) Closed wound
- ii) Open wound

1) Closed Wound

When there is no break in the continuity of the skin but under linked tissue is damaged, such wound called closed wound.

Types of Closed Wound

There are three types of closed wounds as follows;

i) Contusions:

It is produced by any blunt object and subcutaneous tissue is damaged and vascular channel in that tissue is also damaged. Blood spill out and gave bluish to reddish discoloration to the skin.

It may be 1st degree contusions or 2nd degree contusions.

ii) Bruises:

Mild type/form of contusions is known as bruises.

iii) Hematoma:

It is an accumulation of blood into a space outside the blood vessels at any cavity mostly underneath the skin. It mostly seen subcutaneously.

It is a severe form of wounds and more commonly seen in the superficial veins due to any damage such as:

MVH (Mammary vein hematoma) – it may develop due to butting of suckling calf in lactating cattle. ETVH (External thoracic vein hematoma) or Spur vein hematoma. Sometimes hematoma can also be seen in the genital organs & ears. [Hematoma is the swelling of the tissue with fluctuating fluid underneath the skin]

2) Open Wound

There are many types of open wounds as follows;

Types of Open Wounds

i) Incised wounds:

These are produced by any sharp object like scalpel and cause a slit in the continuity of the skin. Such wounds have regular edges or some regular gaps are produced between the edges.

ii) Lacerated wounds:

These are produced by any blunt object e.g. barbed wires. These have irregular or rough edges with elevation of skin at that part.

iii) Punctures:

These are caused by any sharp and pointed objects. These may be deep and have small opening. As these wounds go deep, that's why in certain infection such as tetanus, infectious organism may proliferate in the tissue.

Note: punctured wounds should be made more wider so that anaerobic environment may finished.

iv) Penetrations:

These wounds have a characteristic that they may have communication with any body cavity like thoracic cavity.

e.g. stab incisions.

v) Perforating wounds:

These wounds have two openings, and produced by any object which pierces across the whole thickness of the skin.

vi) **Gun shot wounds:**

In such wounds, point of entry is narrow and deep in the deeper tissues.

They cause extensive damage to the surrounding tissue.

vii) **Abrasions:**

There is exploitation of upper or superficial layer of the skin. Upper layer of the skin is removed and blood will seep out.

viii) **Avulsions:**

It is a type of wounds produced when there is actual loss of tissue.

e.g. Horn avulsion, Hoof avulsion.

ix) **Aseptic wound:**

Wound made under septic conditions e.g. surgical wounds → incision must be aseptic.

x) **Contaminated wound:**

Wound having microorganisms but there is no proliferation.

xi) **Infected wound:**

Wounds having proliferating microorganisms, they start releasing toxins and make the wound more infectious.

xii) **Granulating wound:**

Wound showing tendency of healing or has initiation towards healing.

xiii) **Ulcerating wound:**

Wound showing no tendency to heal – there is no initiation towards healing.

SYMPTOMS OF WOUNDS

There are three types of wound symptoms.

- a) Local b) General c) Remote

a) **Local symptoms:**

These are present locally at wound site such as hemorrhages, bleeding, pain, gaping of edges.

b) **General symptoms:**

These may be characterized by any febrile condition or infection. These symptoms depend on the virulence of the microorganism involved.

e.g. Fever, generalized infection.

c) **Remote symptoms:**

Such symptoms are observed away from the wound.

e.g. swelling of lymph nodes, paralysis of deeper part of the nerve.

HEALING OF WOUND

Healing of a wound is accompanied by following three phases;

- i) Inflammatory phase
- ii) Proliferative / regenerative phase:
- iii) Remodeling / maturation phase

According to another theory, healing may be including following phases;

- i) Healing by 1st intention / Primary union
 - ii) Healing by 2nd intention
 - iii) Healing by mixed intention
 - iv) Healing by 3rd intention
 - v) Healing under scab
- i) **Healing by 1st intention:**

Mostly the wounds having narrow space between the edges are healed by the capillaries and fibroblasts grow from the edges. – also called primary union .

There is very little scar formation and healing is completed within 5-14 days.

Conditions:

- a) Wound must be free from any infection
- b) It should be clean and fresh
- c) It must be free from bleeding.
- d) It must have good blood supply
- e) No dead body or foreign material

ii) **Healing by 2nd intention:**

It happens when there is extensive loss of tissue and wound edges are wider. Capillaries budding start from bottom and edges → anastomose → fibroblasts proliferate and form a meshwork which called as granulation tissue.

Epithelium starts growing on the surface and granulation tissue gets pinky and velvety appearance → constriction of capillaries start → scar is formed which is usually pale in color.

iii) **Healing by mixed intention:**

Wound is healed partially by 1st and 2nd intention. It happens when any suture is disrupted.

iv) **Healing by 3rd intention:**

In this case, the granulating surfaces are united by sutures. Only the purpose is to enhance or facilitate the healing process.

v) **Healing under scab:**

It occurs especially in the superficial wounds like abrasions. In the abrasions, skin exfoliate and exudates comes, its accumulation start and dried later on → then there is scab formation.

Integumentary System

Skin Tumors

PPP (Persistent Purposeless Proliferation). Different skin tumours which are very important but highly ignored.

Etiology:

Etiology of the tumors is still not well-established. It may be due to mutation in the gene/genetic material due to which there is unwanted multiplication of cells. It may be viral in origin.

Classification:

Tumors are classified on different basis; but the most important two types of tumors are:

- (i) Malignant Tumor
- (ii) Benign Tumor

Malignant Tumor	Benign Tumor
It may be ulcerated	It is not ulcerated
Rapid growth	Slow growth
High metastasis	Not metastasized, and mainly localized.
Treatment is very difficult	Treatment is easy
Put pressure on other organs and harmful in its position	Put pressure on other organs but not harmful in its position

Malignant Tumors:

- (1) Melanomas
- (2) Carcinomas (i.e. Squamous cell carcinoma, Basal cell carcinoma)

Benign Tumors:

- (1) Fibroma
 - (a) Corn
 - (b) Equine sarcoid
 - (c) Hygroma
- (2) Papillomas
 - (a) Verucous pododermatitis
 - (b) Warts

MALIGNANT TUMORS

(1): Melanomas

Melanomas are tumors of melanocytes which produce melanin. These mostly occur in old horses with grey colour. They lack melanin pigment due to which susceptible to tumors. There are spots of melanin in grey horses. These spots have ability to develop into melanoma. These can occur at any part but usually on vulva, cranial region and under surface of root of tail. These develop slowly but whenever there is metastasis the development is extensive. Surgical removal is not recommended because of risk of metastasis.

(2): Carcinomas

These tumors are not common in large animals except the carcinoma of the third eye lid. It is common in cattle, buffalo, and grey coloured horses. In case of horses there are more chances due to lack of pigment. Eyes with high white portion are called walled eyes; due to lack of pigment there are high chances of carcinoma in walled eye animals. There are also more chances in high producing animals. These tumours are not metastatic so can be removed easily and removal is successful in cattle and buffalo. In case of horses there are chances of reoccurrence but minimum chances of reoccurrence in cattle and buffalo.

Whenever remove carcinoma also remove some healthy tissue so that you are sure of complete removal of carcinoma and there may not be any chance of reoccurrence. If eyelid is involved then you have to remove it also.

If tumour is malignant then go for biopsy. In case of carcinoma there is abundant blood supply; so be sure to make the arrangement for the control of hemorrhage.

BENIGN TUMORS

(1): Fibroma

These consist of fully developed connective tissue. These may be pedunculated (with neck) or sessile (without neck). These tumours may occur anywhere in the body. These are non malignant so we can easily remove these tumours. Sometimes there are fibrosarcomas and they may metastize. These are invasive (deeply rooted) so we can not remove them.

(a): Corn:

It is a specific type of fibroma. It is also called as interdigital growth. This condition is mostly inherited in ruminants (not present in equine). This occurs at less than three years of age. This condition occurs due to over stretching of inter-osseous ligament of claws. There is a development of fibrous lump due to over stretching of claw due to excessive weight bearing. There is development of folds in the claws that is known as corn. We can remove this condition under local anesthesia and after removal we apply some tincture like tincture iodine and bandage the claws with some water proof material.

(b): Sarcoid (equine sarcoid):

These are called specifically. These are specific type of fibroma which occurs in equines. These do not metastize. If we remove surgically there will be reoccurrence. So there will be no

surgical treatment and we go for the immuno-modulation of the animal with BGG (Bacillus Calmette Guérin) and PPD (Precipitated Protein Derivative). These are immuno stimulants and will cause the regression of sarcoid. BCG is vaccine of T.B. Usually these are on eyelid.

(c): Hygroma:

It is also a type of fibroma. It is a type of acquired bursitis. Most common is the knee hygroma as it mostly occurs at knee. Reason is repeated trauma or irritation. If it is on elbow then called as capped elbow. There is accumulation of fluid resulting into swelling. In case of improper housing, hygroma will be at both knees (bilateral). But if trauma or injury is to one limb then it will be unilateral. In chronic conditions it is painless, there is no physical interference but animal looks blemish.

Best treatment is to remove the cause. Best treatment in acute cases. If we have to drain it, puncture the joint cavity. In this case we are giving way to bacteria, and arthritis may occur. So we can apply crepe bandage.

It is better to avoid drainage but if we have to drain (in case of chronic hygroma) then there are three options.

- a) Drain the cavity and locally inject corticosteroid and antibiotics.
- b) Remove surgically, incise and suture but in this case there are high chances of hemorrhage.
- c) Inject 5 % CuSO₄ solution or tincture iodine into hygroma and after that open the hygroma. Curette it and after suturing apply the tight bandage.

(2): Papilloma

These are pedunculated masses or growth. These may be pin head to several cm in size. There is an enlarged end which is attached with the body with the help of neck or skin. If papilloma is smaller one it can be removed with scissor or emasculator (artery forceps can also be used as emasculator), but if larger one then we have to remove it with scalpel by giving incision but first we have to apply some ligation at the base by purse string suture. Horse tail hair can be used for ligation because it ligates very well. Alternatively take two common pins and insert them at right angle to each other in tumour stalk. Then ligate the tumour at this site. Its benefit is that the ligation will not slip. If papilloma is larger one and consist of high fibrous tissue, it will resist the ligation. Check the temperature of papilloma after few days of ligation; if cold then ligation is proper but if still warm then we have to ligate it again. For ligation use braided (multifilament) nylon or elastic rubber.

(a): Verrucous Pedodermatitis (VPD):

It is a specific type of papilloma which occurs in feet of cattle. It can occur anywhere in feet and most common lesion occurs at anterior and posterior commissure. It mostly occurs due to unhygienic conditions (feet of animal remains dipped in feces and lead to contamination). In this condition there is small over growth covered with papilloma mass. Usually thickness is 20 mm.

Treatment:

We give incision around lesion through the skin and after that we detach growth from s/c tissue. After removal we apply topical dressing with water proof bandage.

(b): Warts:

These are infectious verrucae. These are caused by filterable virus and most commonly occur in cattle and horse. It is composed of fibrous tissue covered with hard layer of epidermis.

In horse: Warts are small and round and most commonly occurs at eyelid, muzzle, ears and lips.

In cattle: occurs in young animal at the head, shoulder, and neck and just like cauliforms. There may be an outbreak as it is due to a virus. This condition is transferable to other animals. Diagnosis is very easy.

Treatment:

There are three options

1. Autogenous vaccine:

Take the mass, titrate it and add antibiotic and then inject in the same animal. It is rough preparation.

2. Application of caustics:

Like arsenic trioxide (caustic) and soft soap mixed in 1:8. It should not be applied on the normal skin.

3. Surgical removal:

If no. of warts is small (8-10) they can be removed like fibrous papillomas. Surgical removal may lead to auto vaccination. If we remove some of the warts the others regress automatically.

Affections of Mammary Glands

Following are affection of mammary gland.

- (1) Supranumerary teat or rudimentary extra teat.
- (2) Amputation of teat
- (3) Teat spider or mucous membrane obstruction
- (4) Leaker/ free milker / relaxed sphincter / enlarged teat orifice
- (5) Hard milker / contracted sphincter / stenosis of teat / stricture
- (6) Imperforated teat
- (7) Lactoliths
- (8) Teat polyps

(1): Membranous Obstruction of Teat Canal/Teat Spider

It is very common condition. It may be congenital or acquired. When congenital, there is improper development of teat cistern and teat canal. When it is acquired, it is due to chronic mastitis and trauma and it usually appears at the time of parturition.

In this condition there is membranous obstruction in the passage of milk and form at the base of teat and sometimes may be at the middle of teat.

When it is acquired there is fully developed teat cistern and teat canal and clinically you can feel the milk pocket above the obstruction and when you locate milk pocket the prognosis is good but if not then not good.

Treatment:

If obstruction infiltrates teat canal local anesthesia above the obstruction in circular fission but if at base of udder then infiltrate 5 % lignocain in the teat canal. Now after anesthesia insert elevator forceps into the membrane and then open the jaw of the forceps so this will rupture the membrane. If it is thin, otherwise, you can use teat bistoury. The proper instrument is Hudson teat spiral. Insert this instrument in teat canal and then rotate it. Rotation will entrap in the teat spiral and then pull it back in jerk. It is recommended not to milk out the teat completely because milk flow will make the opening patent.

When you are unable to locate pocket as in old cases then it is better to use blunt instrument (teat siphon). Try two to three times if unable to locate pocket then leave and let the teat atrophied. Prognosis is good when the case is not chronic one. It is very common in buffalo and highly produced animals.

(2): Leaker / Relaxed Teat Sphincter

In some conditions there is relaxation of sphincter and orifice may become large. Cow with this condition is called as free milker or leaker. The milk comes out from the teat at the time other than milking. There is loss of milk and more damage to teat canal than normal.

Treatment:

Purpose is to create inflammation so that narrowing can be occurred. For this purpose infiltrate sterile mineral oil/lugol iodine solution (KI + NaI) around sphincter. It is an irritant. If inject in the sphincter with 22-26 guage, it will create inflammation but over correction may lead to contracted sphincter. For this purpose place Larson teat tube in the teat and if not available then teat dilators can be used. Larson teat tube is more affected because you can milk the teat as it has a cap.

(3): Hard Milker / Contracted Teat Sphincter

It may be congenital or acquired (due to trauma). It is due to stenosis (narrowing) of teat opening because smooth muscles are present here. As a result of stenosis small stream of milk and milking takes more time. So there is more pressure and teat canal can be damaged.

Treatment:

Due to presence of circular muscles, the orifice of teat canal becomes closed in this condition. It opens when pressure is applied. Sometimes orifice becomes small due to damage. In this case milk comes down but with some pressure. In this case quacks give cut like this.



But a qualified veterinarian will give cut in circular fashion. It will cause the removal of tissue and orifice opens.

Infiltrate local anesthesia around sphincter in circular fashion or give 2 % xylocain in teat canal. Instruments used for it is Lichy teat knife. Insert it and then rotate it. We can also use teat slitter; rotate it in sphincter in circular fashion. Stoll teat bistoury also does the same function. It is knife like with sharp edges. We sill rotate it in teat. Tumour extractor may also be used.

Due to removal of tissue inflammation starts. To prevent inflammation Larson teat tube is inserted in teat after removal. At the time of milking cap is removed. Sometimes teat dilator is also used.

(4): Imperforated Teat

Same procedure is practised as in case of Hard Milker.

(5): Lactolith or Milk Stone or Calculus of Teat Canal

Calculus formation in the teat canal. In this condition there is formation of concretion or nodules of minerals. This concretion is called lactolith. There is deposition of calcium or other minerals that will hinder the milking process. This lactolith is usually movable and sometimes reach the orifice. We can palpate it and feel it as stone like structure in teat canal which cause intermittent milking.

Treatment:

If it is small one, try to remove it out by putting pressure along with milking. But if lager one, remove it with alligator forceps. Insert the alligator forceps in teat canal and crush the lactolith. If it is still not possible then remove it by enlarging the orifice. To prevent inflammation same procedure as in case of hard milker.

(6): Teat Polyp

It is a pea size outgrowth that is attach with the wall of teat canal. It interferes with the milking process. Lactolith is moveable but polyps are fix one. You can feel teat polyps. Difference in consistency

Treatment:

Teat Bestuary is used which is just like knife – free to move and cut the polyps. When it comes near to the orifice then by using alligator forceps, remove it.

(7): Teat Fistula

In this condition there is opening in teat canal from which milk flows continuously. It may be congenital or acquired.

Acquired: Whenever penetrating injury. As there is constant flow of milk opening, there is no healing. So this may be a tiny one and you are unable to locate proper location. Sometime large one and you can see the mucous membrane of teat canal.

Treatment:

Proper time to reconstrict teat fistula is dry period otherwise there are chances of wound dehiscence. Give ring block anesthesia and debride the wound edges if fistula is not old. If fistula is old one, give the elliptical incisions around the fistula and then remove the central portion upto the level of teat canal and locate teat fistula. After locating, suture it layer by or in one layer with the help of vertical matrix suture and non absorbable material and when suture it into the layers, suture teat canal with vicryl by using cushioning over lambert, then subcut tissue suture with catgut, and then skin with non absorbable suture material using horizontal suture pattern and then apply crape bandage to avoid internal pressure. Wound dehiscence is very common.

Complications:

- Narrowing of teat canal
- Reoccurrence of fistula especially when animal is in milking condition.

GALL

It is a local, acute inflammation of skin and s/c tissue due to continuous/constant irritation. When we look clinically there is painful swelling due to accumulation of inflammatory fluid in s/c tissue and between skin layers. There are two types of gall:

Gall is of two types: i) Yoke gall ii) Saddle gall

i) Yoke Gall

It occurs in bovines (cattle, buffalo) and it is localized acute infection of s/c tissue and skin on the neck of ox due to constant friction caused by yoke, so called as yoke gall.

Yoke: It is a wooden frame used to put the ox in cart.

It involves skin or s/c tissue or both and is caused by uneven pressure of yoke at certain point on the neck. When animal moves there is separation of the skin layers and in between these layers, there is accumulation of serum and inflammatory fluid in the form of circular or diffused swelling. Moist skin due to rain or sweating is a predisposing factor. Similarly the young animals are more affected because their skin is soft. Similarly if you put animal on hard ground for ploughing longer period, there will be development of yoke gall. Usually it occurs when there is unequal weight bearing by a pair of the animals.

Clinically yoke gall appears as an acute inflammatory condition. On initial stages swelling is painful and warm and occurs sudden when you remove yoke after working. During work owner is unable to detect the swelling due to pressure exerting on capillaries. When you remove yoke, pressure diminishes on capillaries; so infiltration occur, capillaries become over distended and fluid comes to tissue and swelling occurs.

Termination / Eventualies :

- i) It automatically resolves, if it is less severe and cause of the gall is removed.
- ii) If yoke gall becomes infected, then there is formation of abscess. This abscess will be hot when acute, and cold when chronic.
- iii) Exfoliation of skin when yoke constantly produce friction and attention not paid.
- iv) Constant rubbing of skin may result into wound development.
- v) Slow pressure or low intensity cause results into chronic type of inflammation at the site. Chronic inflammation usually results into fibrosis tissue and then called "Tumor Neck".

Diagnosis:

It depends upon clinical signs and history and you can go for exploratory puncture. If there is no infection then inflammatory fluid but if infection then pus.

In chronic case there may be gangrene, necrosis of the part and sloughing off tissue.

Treatment:

- a) Give rest to the animal.
- b) In acute inflammation in initial stages go for fomentation/cold therapy or go for application of mild iodine ointment.
- c) If there is development of abscess then deal it like abscess, let it mature, explore it and then remove it. After maturation self rupture is best. After rupture if wound edges are regular then suture it, if not regular, make the edges regular and then suture. Before suturing flush it with saline hypertonic solution. Then flush with tincture iodine. Then pack it with bandage soaked in tincture iodine and next day apply non irritant antiseptic like acriflavin.
- d) Systemic therapy of Anti inflammatory and Steroid drugs
- e) Fly repellent and topical antibiotics must be applied if there is exfoliation of skin.
- f) Tumor neck must be treated surgically. Infiltrate local anaesthesia and then remove fibrotic mass of the tissue.

ii) Saddle Gall

Similar condition on the back of the horse as saddle is fixed at this site.

Bed Sores/ Decubitus Ulcers / Pressure Ulcers

It is a localized necrosis of skin and s/c tissue due to constant pressure on the bony prominences. It mostly occurs on the bony prominences because there is less flesh (muscles) at these sites. This occurs when animal is recumbent for a long period. Part of the bone will touch floor, irritation will occur leading to development of ischemic condition in the skin and finally results into necrosis of skin.

Treatment

Provide some soft bedding.

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