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STUDIES ON TAIL AMPUTATION IN ADULT SHEEP
(With 10 Figs.)

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دراسات على استئصال الزيل فى الأغنام

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تم اجراء هذا البحث على عدد ٢٥ من الأغنام لدراسة جراحات الذيل واستئصاله وكذلك توزيع الأوعية الدموية في ثمانية زيول بالإضافة الى أربعة أغنام ميتة لتتبع منشأ هذه الأوعية وقد ثبت من هذه الدراسة أن استئصال الذيل هو العلاج الجذرى لكثير من اصابات هذا العضو ووجد أيضا أن عملية الاستئصال الكامل أسهل كثيرا من الاستئصل الجزئي لامكان تفادى النزيف بربط الأوعية الدموية من منشئها. ومن الدراسة التشريحية والاشعاعية وجد أن المدد الشرياني للذيل يكون من الشريان الذيلي الوسطاني والمدد الوريدى من الوريد الذيلي الوسطاني وكذلك الوريد الذيلي البطني الوحشي الذى ينشأ في الأغنام من الوريد الذيلي الكفلي.

SUMMARY

The indications and techniques for tail amputation were studied in 25 sheep. The distribution of the blood vessels within the organ and their importance for the surgical interventions were also studied in 8 amputated tails and 4 dead animals.

Amputation proved to be the radical treatment for many surgical affections of the tail in sheep. complete amputation was much more easier than partial amputation, where in the former technique the belly of the organ with the massive amount of fat and numerous collateral blood vessels imbeded in it could be avoided.

The arterial blood supply of the tail is from the median caudal artery while the venous drainge is via two sources, the median caudal vein and the ventrolateral caudal vein which arise, in sheep, from the caudal gluteal vein.

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INTRODUCTION

amputation of the tail is indicated in cases of infection, ischemic necrosis, injury, neoplasms (OEHME and PRIER, 1974 and FRANK, 1981), gangrene (PUROHIT, et al. 1985) and for cosmetic purposes (ARCHIBALD, 1974 and FRANK, 1981).

In lambs, tail amputation (docking) may be done routinely to help in keeping the rear parts cleaner, drier, and more pleasing in appearence, and to improve ease of entry for the ram's penis during breeding. The operation can be performed at any age, but the most satisfactory time is when the lamb is 1-2 weeks old (OEHME and PRIER, 1974 and WATTS and LUFF, 1979).

Partial amputation of the tail in adult sheep was indicated in some cases of biting wounds and fracture of the coccgeal vertebrae (KASSEM, 1988 and AZIZ, 1990).

Although, the vasculature of the tail region was described in many domestic animals (FRETAGE, 1962; BROWN and CARROW, 1963 and EL-AYAT, 1983), a detailed study of the tail vasculature in sheep is meagre.

It is aimed presently to study the indications and techniques for amputation of the tail in adult sheep, as well as the distribution of the blood vessels within the organ and the importance of them for the surgical interventions.

MATERIAL and METHODS

The surgical part of this study was conducted on 25 sheep (native breed). The animals were divided into 4 groups. The operations were performed under effect of lumbosacral epidural analgesia.

Group I: Accidental wounds (14 Cases).

Washing, cleaning, curetting, depridment and suturing of the wounds were performed in 6 cases. Four animals of them returned within 4 to 7 days with different complications. Complete tail amputation was done for these cases. The technique was also performed urgently in other 8 animals.

Group II: Surgical wounds (6 Cases).

A transvers wound was done in the skin and subcutaneous tissue and deep in the fat; including about the two thirds of the dorsal surface in 3 cases and the two thirds of the ventral surface in other 3 cases. The wounds were dealt with as usual.

Group III: Partial amputation of the tail (5 Cases).

Amputation of about the two thirds of the tail was performed through two crescentic incisions; one on the dorsal surface and the other on the ventral surface. The

dorsal skin flap was dissected long enough to meet the ventral one on the ventrodistal edge of the amputation stump.

Group IV: Complete amputationof the tail (12 Cases).

The complete tail amputation was performed in 12 animals with accidental wounds in the tail. The amputation was done through two crescentic incisions; the ventral one was about 2 fingrs breadth caudal to the anus, and the dorsal one was about 5 fingers caudal to the anus level. The skin and subcutaneous tissue of the dorsal and ventral flaps were dissected proximally to the level of the anus, wher the tail was disarticulated. The blood vessels were ligated and the wound was closed as usual. No antibiotics were used intra or postoperatively.

The anatomical part of the study was conducted on 8-amputated tails and 4 dead animals. The amputated tails were injected with barium; 4 through the median caudal artery and 4 through the medial caudal and the ventrolateral caudal veins. The specimens were radiographed just after barium injection. The same specimens were injected with gum milk latex and dissected.

The dead animals were injected with water to wash the blood vessels and after that were injected with the latex; 2 through the internal iliac artery and 2 through the common iliac vein to distinguish the origin of the vessels of the tail.

RESULTS

Group I: Accidental wounds.

Recent wounds were recorded in 6 cases; 2 longitudinal and 4 transverse. The transverse wounds were accompanied by outrolling of the lower lip of the wound and separation of the skin and subcutaneous tissue in a large area (Fig. 1). After the surgical intervention, only the longitudinal wounds (2 cases) healed by first intention. The animals with transverse wounds (4 cases) returned with 4 to 7 days with necrosis and dehiscence of the skin of the lower lip of the wound (Fig. 2).

Old wounds were recorded in 8 animals. Most of the cases (6 animals) were with severe lacerated wounds (Fig. 3). The other (2 cases) were complicated with oedema in th tail which may be so severe to the degree that the animal walk with great difficulty (Fig. 4 & 5). Complete tail amputation was the radical treatment for these cases.

Group II: Surgical wounds.

The surgical wounds, including the two thirds of either the dorsal surface or ventral surface healed by first intention without any complications.

Group III: Partial amputation of the tail.

Since the wounds were in the distal two thirds of the tail, the partial amputation was performed leaving only about the proximal one third (Fig. 6). Although all the cases healed by first intention, much haemorrhage occured during surgery, from the numerous small blood vessels imbeded in the fat and which could not be easily seen.

Group IV: Complete amputation of the tail.

Complete amputation was the prefered treatment for the old wounds where oedema, contamination and infection, with necrosis in massive areas were detected. The amputation was performed higher (Fig. 7) to be away from the affected areas. The tail was dissected and amputated at the level of the anus, leaving the most proximal part for protection of the rectum and surrounding tissues. Introduction of a pluge for a considerable distance into the rectum, not only protected the field from contamination, but also was a warning sign to avoid injury of the rectum. Bleeding was much lesser in complete amputation where at this level the control of the main blood vessele was much easier than the control of the numerous collateral branches ramifying in the fatty belly of the tail (Fig. 8 7 9).

It was much easier after making the dorsal skin incision to perform surgery while the animal in dorsal recumbency. The bony and muscular structures with the main blood vessels were more accessible from the ventral surface.

The anatomical results revealed that the arterial supply of the tail in sheep arises from the middle sacral artery (Fig. 8). This artery passes caudally ventral to the sacrum. At the level of the first caudal vertebra it continues as the median caudal artery which passes on the ventral aspect of the tail until its tip. During its course it gives off collateral branches that disribute in the fat of the tail and terminate in the skin. The rami caudales (Fig. 8) arise in a regular manner at the middle of each caudal vertebra, passing caudodorsally to join each other ventral and dorsal to the transverse processes of the caudal vertebrae to form the ventrolateral caudal and dorsolateral caudal artery respectively (Fig. 8). These rami mainly supply the muscles of the tail.

The venous drainage of the tail of sheep is via two sources, the median caudal and the ventrolateral caudal veins. The median caudal vein (Fig. 9) is the direct continuation of the middle sacral vein. It passes along the ventral aspect of the tail up to its tip ventral to its satellite artery. During its course it gives rami caudales which suply the muscles of the tail, and collateral branches which anastomose with collateral ones of the ventrolateral caudal vein.

The caudal gluteal vein arises from the internal iliac vein at the level of the lesser isciatic foramen. It passes through a small vascular foramen in the broad pelvic ligament and at the tuber ischii it detatches the ventrolateral caudal vein which leaves

the pelvic cavity through the pelvic exit. It continues its course within the fat in the ventrolateral aspect of the tail. It passes in a convergence manner to gain the muscles of the tail as well as the ventrolateral caudal artery at the level of the nineth caudal vertebra. Then after, it completes its course with the artery to the tip of the tail. During its course it gives collateral branches which supply the fat of the tail and anastomose with those of the median caudal vein.

Injection of one of the specimens showed blokage of some of the collateral veins arising from the ventrolateral and median caudal veins. This may be due to efficiency of the valves in that case (Fig. 10).

DISCUSSION

Complete amputation proved to be the radical approach for many affections of the tail in adult sheep. Although the longitudinal wounds in the tail healed without complications, dehesence and necrosis of the distal wound lip were the results in all transverse accidental wounds. On the other side, the transverse wounds which were performed surgically healed perfectly. The dehiscence and necrosis of the distal wound edge in case of the transverse accidental wounds may be attributed to deprivation of a large area of skin from its blood supply. Therefore, amputation may be indicated not only in the complicated cases of wounds and fractures of the tail in adult sheep (KASSEM, 1988 and AZIZ, 1990), but also in the large transverse wounds with separation of a large area of skin.

Complete amputation of the tail in adult sheep seemed to be more easier than partial amputation, where in the former technique the belly of the organ with the massive amount of fat and numerous collateral blood vessels imbeded in it can be avoided by ligation of the main blood vessels supplying the tail.

The median caudal artery in sheep gives off collateral branches that distribute in the fat of the tail and terminate in the skin. El-Ayat described similar branches in buffalo as rami caudales superficialis.

NICKEL, et al. (1981) mentioned that in all domestic animals the caudal gluteal vein and its corresponding artery subdivide similarly. Howevere, the present study showed that the ventrolateral caudal vein arise from the caudal gluteal vein while the corresponding artery arises from the joining of rami caudales of the median caudal artery ventral to the transverse processes of the caudal vertebrae i.e. not from the caudal gluteal artery.

In carnivores NICKEL, et al. (1981) described a vein arising from the caudal gluteal vein, passing superficially and laterally toward the tip of the tail and named it V.

caudalis lateralis superficialis. This vein more or less looks like the ventrolateral caudal vein of sheep in its origin and course.

The dorsolateral caudal vein that described, in all domestic animals except horse, by NICKEL, et al. (1981) could not be observed in the present work. However, FREYTAG (1962) mentioned that from the caudal gluteal vein in sheep arises a skin vein, which gives a vein passing on the dorsal aspect of the tail up to its apex.

The V. sacralis mediana arises from the ipselateral common iliac vein (NICKEL, et al. 1981). The present study investigated that the median sacral vein originated from the right common iliac vein in all examined specimens.

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LEGENDS

Fig. (1): Recent wound with outrolling of the lower lip of the wound and separation of the skin in a large area.

Fig. (2): The wound in figure (1), 5 days after treatment (dehiscence with necrosis of the lower lip of the wound is observed).

Fig. (3): Severe lacerated wound on the ventral surface of the tail.

Fig. (4 & 5): Old wound with remarkable oedema of the tail in sheep.

Fig. (6): Partial amputation of the tail.

Fig. (7): The case in figure (1 & 2) after complete amputation of the tail.

Fig. (8): Arteriographic picture of the tail of sheep (dorsoventral view). The distal part of the tail is normally rotated. Therefore it appears in a lateral view.

1) Median caudal artery.
2) Rami caudales of 1.
3) Colateral branches of 1.
4) Ventrolateral caudal artery.
5) dorsolateral caudal artery.

Fig. (9): Venographic picture of the tail of sheep (dosoventral view).

1) Median caudal vein.
2) Rami caudales of 1.
3) Collateral branches of 2.
4) Ventrolateral caudal vein.
5) Collateral branches of 4.

Fig. (10): Venographic picture of one specimen, in which only the stumps of the collateral branches are shown.

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TAIL AMPUTATION IN SHEEP

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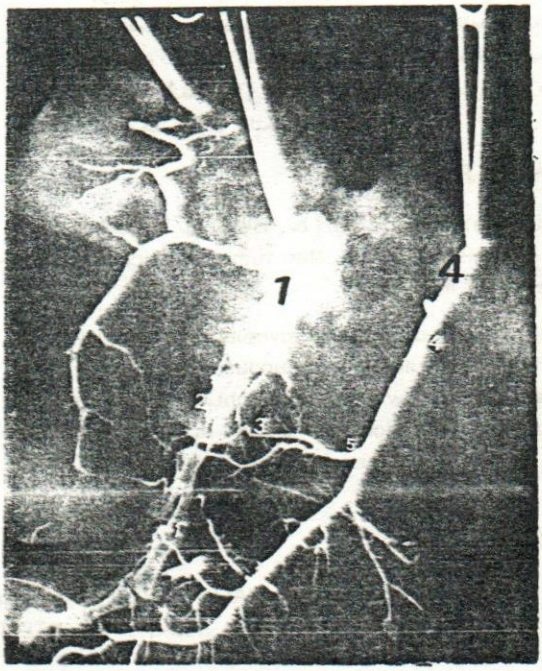

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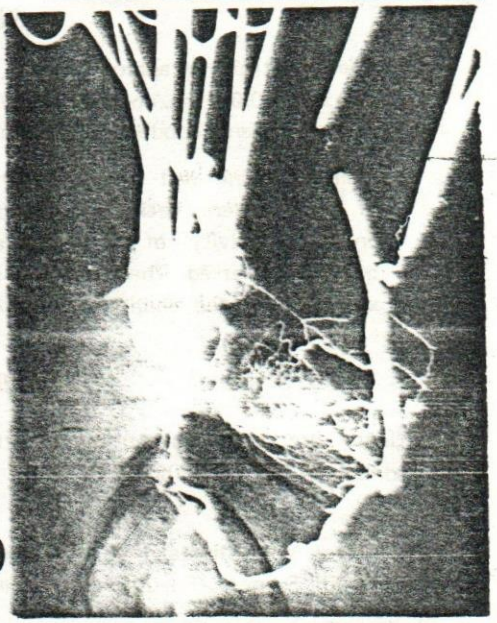

10