FORMATION OF THE PREPUTIAL CAVITY OF THE PENIS OF ONE HUMPED CAMEL

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ABSTRACT

The present work was down on the penises of immature camel of 3-36 month of age.
This work is done to investigate the stepes and method of the separation between the free end of the penis and its sheath to forming the preputial cavity.

INTRODUCTION

Little has been written about the early postnatal developmental changes in the attachment of the penis and prepuce in domesticated animals. The literatures are sparce and most of the studies were down on mature animals. In camel very little attention has been paid to the attachment of the penis with its sheath. Many authers (1,2,3,4,5) in camel study the male genital system and all these studies have been made on mature camel , but they remember that there is adhesion between the penis and his sheath still up to 2-3 years without any details. In young llama and alpacas the penis has no ability of exteriorize less than two years because of present of preputial – penis attachment (6).More details study was down by (7,8,9) on the attachment of penis and its sheath of young bull calve. They describe the postnatal changes in the united integument epithelium of the penis and its sheath.

There is no previous study focused the light on the adhesion between the penis and its sheath in camel in details. So the aim of present study is to established details information about the formation of preputial cavity in camel.

MATERIAL AND METHODS

For anatomical study

A total penis with its prepuce from eight immature young camel of 3-36 month of age were collected from AL_Najaf slaughter house , for grossly examination and measurements of the free end of penis and preputial cavity . Specimens transported in cool box with ice to laboratory for further study. The measurements were made on fresh material by using measurement tap against centimeter and veriner- caliper as following

1. The length of preputial cavity was measured from the preputial orifice to the junction of the parietal lamina(internal) with the penile lamina
2. The diameter of preputial orifice.
3. The diameter of preputial cavity in middle of its length.
4. The length of the free part (end) of penis is measured from the tip of glans penis up to the attachment of the internal lamina of prepuce with penis.
5. The circumference of the free end of penis measured in the middle length of free end. The measurements were down according to (10).

For histological study

The free end of penis with its adherents sheath from six immature young camel of 3-36 month was removed immediately after slaughtering. The specimens divided according to their age on to three groups as following

1. First group, specimens of 3-12 month of age.
2. Second group, specimens of 13-24 month of age.
3. Third group, specimens 25-36 month of age.

The free end of penis with its adherents sheath was divided in to three parts

1. Cranial part-extend from the tip of penis to the neck of glans.
2. The remain part is divided in to two equal part.

All specimens were fixed in 10% formalin then routine histological technique made, [dehydration, clearing, embedding in paraffine wax] sections were stained with [Hematoxylin and eosin, Van -Giesson and Masson's trichrome stain](11)

RESULTS

Anatomical study

The prepuce of young immature camel 3-36 month in small mass of triangular shape compresed from side to side. During no sexual arousal the small preputial orifice, (Table 1) directed caudally. The prepuce has slightly convex cranial border and concave caudal border Fig (1). The base of prepuce attached to the abdominal skin in the inguinal region. The skin of prepuce covered with few fine, short hair also has two rudimentary nipples Fig (1). The prepuce consists of single parietal lamina which passes back word and reflected forward on the penis forming the visceral lamina. Both laminas are dark brown to dark gray in colour Fig (2).The preputial cavity divided in to two portions:

1. Prepenile portion of preputial cavity is the part extend from the preputial orifice to the tip of glans penis which has normally clear cavity present even in the fetus and young immature camel Fig (2).
2. penile portion of preputial cavity that part which extend from glans penis toward the reflection of parietal lamina of sheath upon the penis , in other word that part of preputial cavity which is occupied by the free part of penis . In young camel less than three years there is attachment between the two lamellae (parietal and visceral) so that no preputial cavity is present in that portion Fig (2).

Histological study

Histological sections from first group (3-6 month) showing complete adhesion between the two epithelial lamina of the penis and its sheath forming ectodermal lamella which is incomplete corrected encircle lamella around the free end of penis Fig (3).and as age advance up to 12 months the ectodermal lamella become complete encircle lamella except beneath the urethra where the two edge of ectodermal lamella overlapping Fig (4), leaving small passage for connective tissue connecting between penis and prepuce that is called frenulum Fig (5). The frenulim is the connection between the caudal part of the free end of penis and prepuce beneath the urethra and made of bundles of connective tissue mainly collagen fibers passing oblique is rich with veins Fig (6).The structure of the ectodermal lamella consists of several layers of cells can be recognized as three zones:

1. The outer zone, which resembles the germinative layer of penile sheath epithelium. It composed of 2-3 layer of cuboidal to columnar cells resting on the basement membrane.
2. Inner zone, which resembles to the germinative layer of penile epithelium it composed also from 2-3 layer of columnar cells.
3. Middle zone, it consist of several layer of cells which join the inner and outer layers their cells have pale stained nucleus Fig (6).

Histological section from second group (13-24 months) showing the beginning of formation of keratinization appears in side middle zone of the ectodermal lamella as concentrically small ball of cells Fig (7). As the keratinization balls develop leading to limited separated area of the ectodermal lamella in two well recognized penile and sheath epithelium. There are no effects on the both inner and outer zones of the ectoderm Fig (8).

The histological section from third group (25-36 month) showing more keratinization ball developed in the middle zone and the previous one become large in size , they become neighbor Fig (9), and they opened on each other and as a final result there is a contentious separation of ectodermal lamella around the free part of penis in to two layers. Usually complete separation occurs in age of 30-36 month. Fig (10).

Table 1 :- Measurements (± SE) of the free part of penis in the three groups of age.

Age / Month	Length /cm	Circumference / cm
3-12	7.1±1.9	0.91±0.1
13-24	8.3±0.9	1.0±0.5
25-36	10.1±1.2	1.1±0.6

Table 2:- Measurements (± SE) of the perputal cavity and perputal orifice in the three groups of age.

Age / Month	Length of preputal cavity /cm	Circumference of preputal cavity/ cm	Diameter of perputal orifice
3-12	9.2 ± 2.1	1.22±0.2	1.32 ± 0.42
13-24	10.3 ± 0.7	1.25 ± 0.16	1.4 ± 0.41
25-36	11.5 ± 0.12	1.33 ± 0.2	1.59 ± 0.6

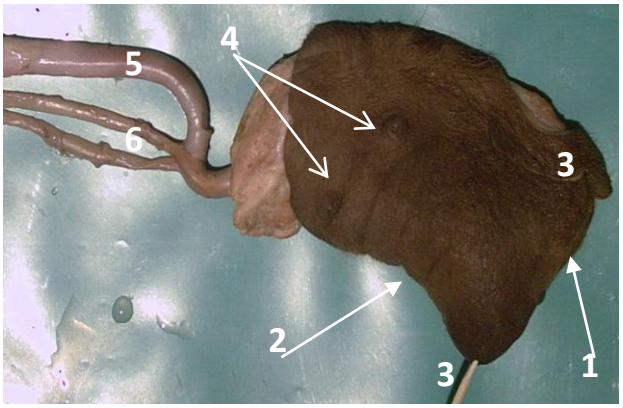

Fig (1) prepuce of immature camel

1-cranial border /2-caudal border/3-preputial orifice4-rudimentary nipples /5- penis /6- retractor muscle of penis

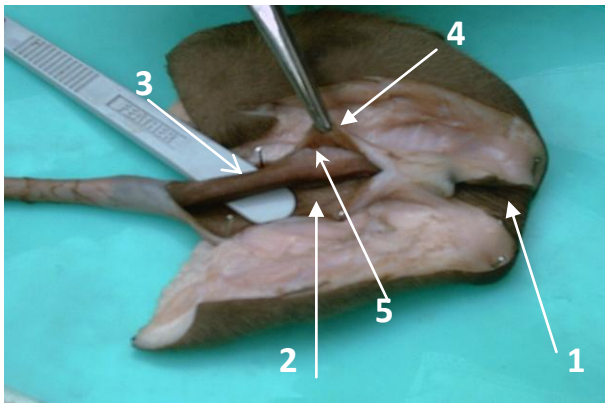

Fig (2) prepuce of immature camel (opend)

1- prepenile portion of preputial cavity /2-penile portion of preputial cavity 3- free part of penis4-internal lamina of prepuce/5- area of attachment

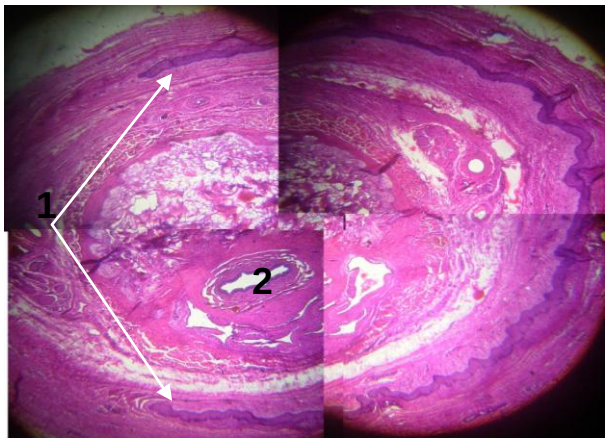

Fig (3) cross section in the free part of penis in the immature camel (3-6 months)showing

1-incomplete circle of ectodermal lamella/2-ectodermal lamella.

H&E X30

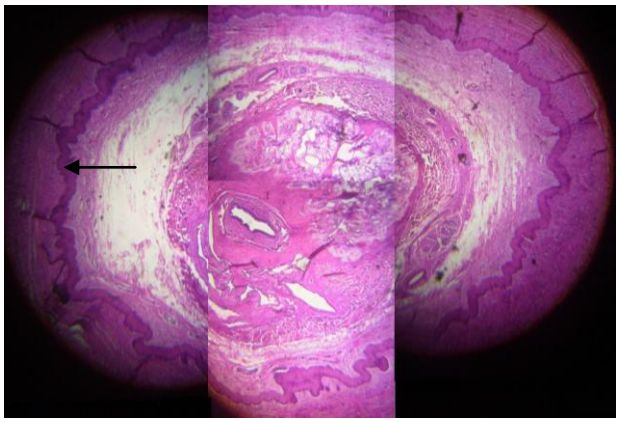

Fig (4) cross section in the free part of penis in the immature camel (12months) showing complete circle of ectodermal lamella((arrow))

H&E X30

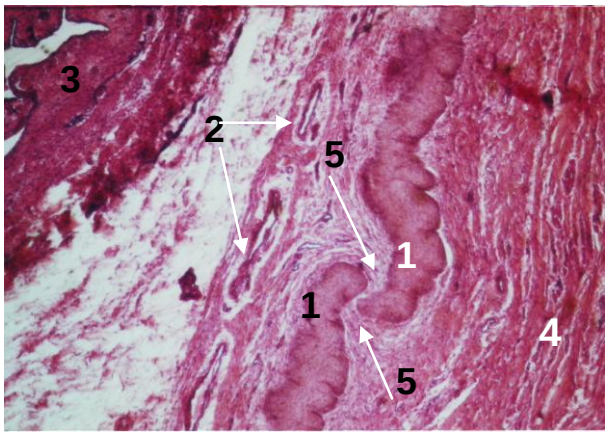

Fig (5) cross section in the free part of penis in the immature camel (12 months) showing1-over lapping edges of ectodermal lamella/2-large veins of frenulum/3-cross section of the three part of the penis/4 connective tissue of the prepuce/5

Fig (6) ectodermal lamella at the frenulum showing:1-inner zone(penile epithelum)/2-outer zone preputial epithelium/3-middle zone/4frenulum Masson's trichrome X600

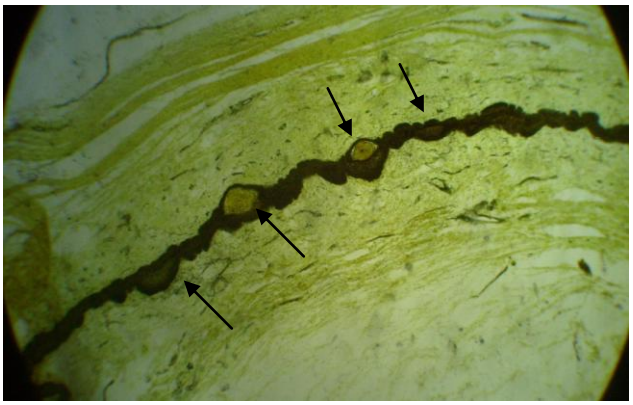

Fig (7) cross section in the free part of penis in the immature camel (12 months) showing: different stages of development keratinization balls in the middle zone of ectodermal lamella(arrows)

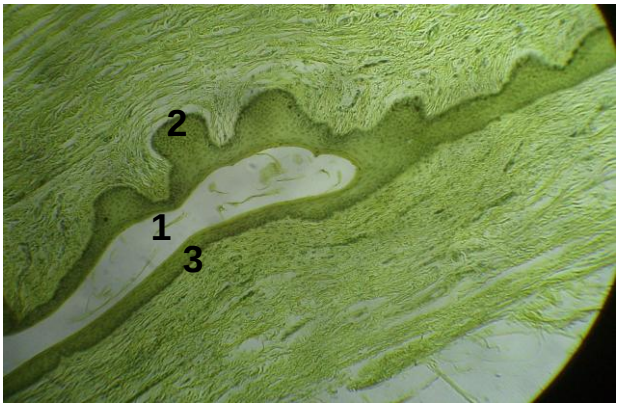

Fig (8) cross section in the free part of penis in the immature camel (after 12 months) showing: 1-partial separation on the ectodermal lamella into two well recognized layers/2-penile part of ectodermal lamella /3-preputial part of ectodermal lamella Van –Giesson X120

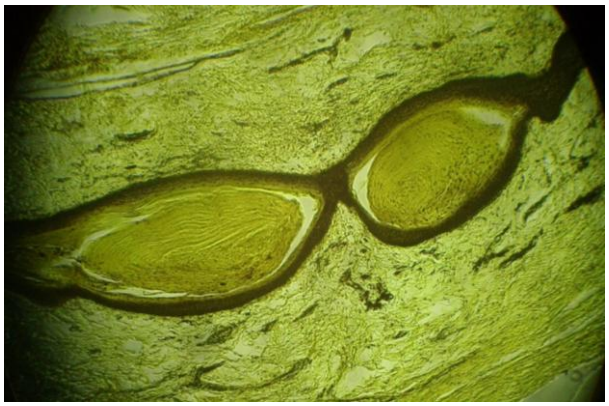

Fig (9) cross section in the free part of penis in the immature camel (after 12 months) showing: two large neighbor keratinization balls developed in order to open on each other

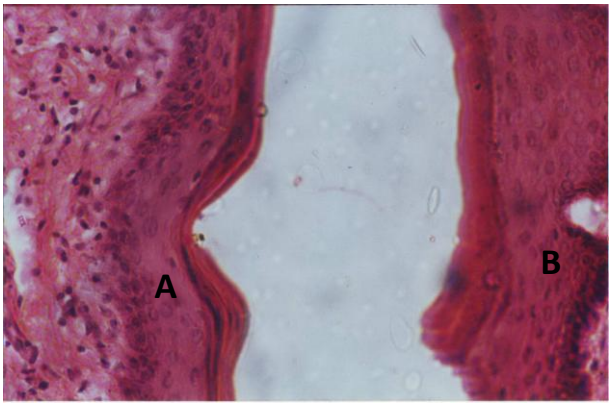

Fig (10) cross section in the free part of penis in the immature camel (30-36 months) showing: complete separation of the ectodermal lamella in to : A-penile- lamella

DISCUSSION

The prepuce of young camel is triangular in shape with slightly convex cranial border and concave caudal border this is agree with (2, 3) in mature camel. The preputial cavity divided in to per penile and penile portion this is similar to the result of (9) in beef cattle. The preputial orifice in camel is directed caudally, for this the camel urinated toward. The preputial orifice could be move onward during erection by action of group of preputial muscles (5). The two epithelial lamella of the penis and prepuce adhered in young camel of (3-12) month forming ectodermal lamella , this is agree with (1,2,3,4,5) in camel who said that the internal lamina of perpuce remain fused in immature camel below 3 years . Also agree with the finding of (6) in llama below 2 years, which remember that the penis in young llama below 2 years has no ability to exteriorize from prepuce because of the present of preputial adhesion, also it is typical agreement with result of (7, 8) in young bull calve, they said the penile sheath and penile integument are united by epithelial fusion up to 3 years.

At the age of 13-24 month keratinization start to appear inside the middle zone of the ectodermal lamella as concentrically small ball of cells. This is exactly agreement with the finding of (6) in young bull calve which remember that the keratinization formed mass of cells appear as epithelial pearls.

Our suggestion for the present of keratinization inside the middle zone of ectodermal lamella is either due to less blood reaching this area leading to death of cells or due to hormonal factors and this is agree with (12) who said that the separation of the ectoderal lamella is controlled by steroid hormone. At the age of 25-36 months more keratinization develops and more separation. There is no change found in both inner and outer zone of ectodermal lamella, similar finding was seen by (7) in young bull which remember there is no any effects of keratinization upon the inner and outer zone. Complete separation occur in between (30-36 months this is agree with (6) in young bull.

تكوين تجويف القلفة في قضيب الجمل وحيد السنام

مهـــدي عبـــد الكريـــم عطيـــة

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الخلاصة

اجريت هذه الدراسة على قضبان من جمال غير بالغة ذوات اعمار ((3-36)) شهر وذلك للتعرف على مراحل وكيفية انفصال غشاء القلفة عن الجزء الحر من القضيب وتكوين تجويف القلفة.

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