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Histopathological Changes in Testis after Partial Caput Epididymectomy of Teaser Rams

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Abstract:

Three healthy adult local breed rams were subjected to partial caput epididymectomy to evaluate histopathological changes. The skin in caudal aspect of scrotal raphe pouch was transected longitudinally. The first testis was forced toward the other, the tunica vaginalis was incised at the upper of the epididymis body and a piece of one cm in length was removed from it with ligation. The same procedure was repeated for the other testis. Time of sexual desire was significantly longer ($p<0.05$) after one and two weeks of the operation than three and four weeks for control, while it was longest after one weeks among all other periods. Sperm concentration was significantly lower ($p<0.05$) after 2, 3 and 4 weeks than the first week for control, while it was significantly lower after first week than control. The histopathological changes in testicular tissue were evaluated after one, three and six months of the operation. The results revealed thickening of the basement membrane of seminiferous tubules and degeneration, necrosis of spermatogonia and sertoli cells. Some seminiferous tubules appeared only with covering basement membrane. The Leydig cells were proliferated at the first period, while there was decrease in their number at the last period.

Key words: Teaser Rams, Partial caput epididymectomy, Epididymal blockage, Testicular histopathological changes.

التغيرات النسيجية المرضية للخصية بعد عملية الازالة الجزئية لجسم البربخ في الكباش الكاشفة

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الخلاصة:

اخضعت ثلاث من الكباش المحلية السليمة لعملية الازالة الجزئية لجسم البربخ ومن ثم تم تقييم التغيرات النسيجية المرضية فيها. حيث أجريت العملية بقطع الجلد طولياً في الجهة الخلفية للرفاية الصفنية. دفعت الخصية الاولي بإتجاه الخصية الأخرى. وقطعت الغلالة الغمدية أعلى جسم البربخ حيث أزيل منه بمقدار 1سم وربطت نهايته. أعيدت نفس الخطوات على الخصية الاخرى. وقت الرغبة الجنسية كان اطول معنوياً بمستوى ($p<0.05$) في الاسبوع الاول والثاني

من العملية مما هي عليه في الاسبوع الثالث والرابع وفترة ما قبل العملية، بينما كان الاسبوع الاول وهو الاكثر طولاً لهذه الصفة من الاسابيع الاخرى. تركيز النطف أظهر إنخفاض معنوي بمستوى ($p<0.05$) في الاسابيع الثاني والثالث والرابع اقل مما هو عليه في الاسبوع الاول وما قبل العملية. جرى تقييم التغيرات النسيجية المرضية لنسيج الخصية في الاشهر الاول والثالث والسادس مابعد العملية. النتائج كشفت عن حدوث تثخن في الغشاء القاعدي للنبيبات المنوية. تنكس وتنخر في الخلايا المولدة للنطف وخلايا سرتولي. وزيادة في خلايا اللايدك في الفترة الاولي ومن ثم حدث قلة في أعداد هذه الخلايا للفترة الاخيرة.

Introduction:

Teaser rams are useful to advance the breeding season, synchronize ewes, and detect return to estrus in non-pregnant ewes (1). Rams secrete pheromones from their wool wax which has a dramatic and immediate effect upon ewes which have been kept apart from rams for several weeks. The ewes that are exposed to a teaser ram roughly one-half will exhibit estrus at around 18 days after first exposure, and the remainder will exhibit estrus at around 24 days. The use of teaser rams can be used to encourage ewes to breed a few weeks earlier than they would normally (2). There are two types of teaser preparation nonsurgical as chemical sterilization, and surgical as vasectomy techniques (3). After vasectomy is performed, changes occur in the epididymal epithelium, luminal contents, inflammation in the epididymal interstitial tissue, and gross epididymal alterations (4).

Therefore, the histological examination is important to investigate how much histopathological changes would manifest in the structures and levels of severity on the testis and epididymis after sperm passage is closed. It is important to increase the possibility of foretelling future damage and its on testes thereafter. Obviously, despite of these changes, one can prospect the length of time that survival animal maintain sexual desire and lowering sperm concentration to zero.

Literature Review

There are two types of detector animals are commonly used: surgically altered bulls and hormone treated animals. Vasectomized bulls are altered surgically so that normal mating may occur, but sperm transport is blocked (5).

The sclerosing agents were injected into the caudae of the epididymis of adult and prepubertal males induced a long-lasting and probably irreversible azoospermia. The technique is easy to do and inexpensive, does not seem to cause undesirable side effects and appears suitable for large-scale sterilization programs in males (6).

Burdizzo was crushed the epididymis without an open wound. The operator grasps the neck of the scrotum with his left hand and pulls down the testicles, so that the cauda epididymis is clearly visible (7).

An incision is made laterally in the distal extremity of the scrotum above the cauda epididymis. This incision passed through the skin, dartos, scrotal fascia and the parietal layer of the vaginal tunic. Ligation of both the body of the epididymis and the vas deferens were then clamped using large artery forceps and the cauda epididymis was removed distal to the forceps (8).

Materials and Methods:

The following materials were used in this study: Xylazine 2% as sedative agent, Lidocaine injection 2% as local analgesic drug, hemostatic forceps, pointed scissor, and surgical suture material (Silk 3) for scrotum suturing.

Before the surgical operation, animals were prepared by the clipping and shaving scrotum area and around it, Xylazine 0.2mg/kg for sedation and Lidocaine 2% as local infiltration analgesia.

The caudal scrotal midline skin incision was made and the tunica dartos was

divided until the parietal vaginal tunica was encountered. An incision approximately 1cm long was made through either left or right parietal layer of tunic vaginalis and the cranial edge of this incision was grasped with Allis forceps. The testicle is stabilized with one hand while a second Allis forceps is inserted in a cranial direction into vaginal cavity and advanced to the point of the medial reflection of the vaginal tunic with other hand. The epididymis can be grasped in this area, and separated easily from its attachment with testes and should be ligated as far proximally and distally as possible. A large section of the interposing part is removed to prevent anastomosis. The procedure was repeated for opposite side of the scrotum.

The small incision through the parietal vaginal tunics need not be sutured but dead space in the tunica dartos should be eliminated. The skin is closed in a routine manner. A course of antibiotic therapy was given for 3-5 days.

Time of sexual desire (minute) and sperm concentration were examined for four periods after operation (1, 2, 3 and 4 weeks) and compared with the control (0), which was taken before operation. The data were subjected to one way analysis of variance (ANOVA) to investigate the significance of periods for both variables(9), using SPSS Statistical program version 2,1. least significant difference (LCD) was applied for comparison between means.

Gross examination and histopathological changes was performed on cross sections of testicular tissue one, three and six months after castration, using 1cm3 from upper, medal, and lower part of the testicular parenchyma, as wall as head, body, and tail of the epididymis were used to evaluate the severity of histopathological changes.

Results:

Table (1) showed that the time of sexual desire (minute) was significantly longer ($p<0.05$) for 1 week after epididymectomy (12.3±1.8) than the rest of periods and control. However, the time of sexual desire/minute for 2, 3, and 4 weeks declined with increase in weeks after operation.

Table (1) Time of sexual desire/minute

Weeks	0	1	2	3	4
Mean ± SE	A 2.53 ± 0.3	B 13.2 ± 1.8	C 4.54 ± 0.6	A 2.32 ± 0.5	A 2.57 ± 0.2

Table (2) showed that sperm concentration (10^8/ml), was significantly lower ($p<0.05$) for 2, 3 and 4 weeks comparing to first week and control. Also, sperm concentration for first week was significantly lower than control.

Table (2) Sperm concentrations (10^8/ml)

Weeks	**0**	**1**	**2**	**3**	**4**
Mean ± SE	A 2.45 ± 0.3	B 0.97 ± 0.1	C 0.36 ± 0.1	C 0.063 ± 0.03	C 0 ± 0

Rams were suffered from severe pain and swelling (edematous) and redness in operation site for 4 days. These signs were eased gradually until it disappeared after 7-10 days. Swelling was observed through palpation in the body and the head of the epididymis above the blockage area. This swelling was simple in the third day and increased in inflation later. It was possible to differentiate between the body and the head of the epididymis by eye from outside the scrotum after 10-14 days of the operation when moving the testicle by hand.

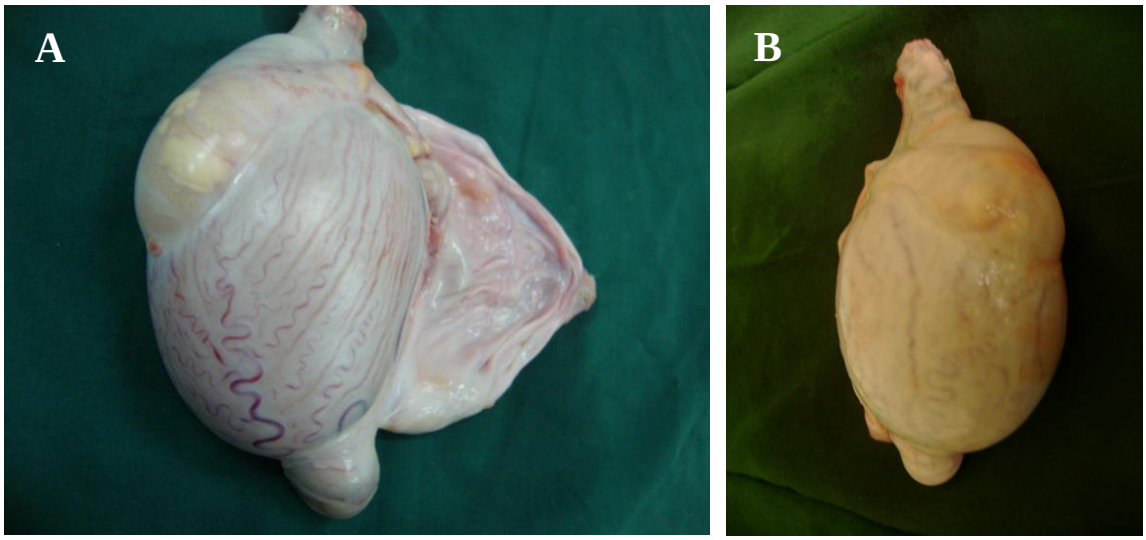

Figure (A) Gross show of castrated testes after three months from operation.
Figure (B) Gross show of castrated testes after six months from operation.

Adhesions between the scrotal skin and parietal layer of tunica vaginalis and between parietal layer of tunica vaginalis and visceral layer of tunica vaginalis were observed after castration with small tail in size of the epididymis (Figure B). The body and head of the epididymis were suffered from enlargement and swelling lesions that containing yellowish milky fluid (Figures A&B).

The seminiferous tubules showed histopathological changes after one month. These were recognized as atrophied in the seminiferous tubules, thickening in interstitial connective tissue, and slightly proliferation of Leydig cells (Figures C&D). While the epididymis showed hyper atrophy of interstitial connective tissue and degeneration of epithelia in the tail (Fig. E), the head was suffered from thickness in connective tissue and accumulation of large mass of sperms in lumen of epididymal duct (Figure F). The body also showed thickness and fibrosis in connective tissue, large mass of sperms in lumen of duct and degeneration in epithelia (Figure G).

The histopathological changes were more sever in three months period than in the first one where the seminiferous tubules were recognized as more atrophied and lined by basal membrane, damage in connective tissue, degeneration and necrosis in germinal and sertoli cells (Figure H). While the epididymis observed hyper atrophy of interstitial connective tissue, sloughing in epithelia of epididymis duct and embedding of tissue in the tail (Figure I), the head was suffering from more thickness in connective tissue, atrophied lesion in basal and principal cells of duct, and accumulation of largest mass of sperms in lumen of epididymal duct (Figure J). The body was undergoing high

thickness and fibrosis in connective tissue, with obstruction and narrowing of epididymal duct (Figure K).

After six months period, the seminiferous tubules were separated from connective tissue and showed damage in interstitial connection tissue, marked decrease in the number of Leydig cells, degeneration and necrosis of germinal and sertoli cells (Figure L). The histopathological changes of the epididymal tail and body were similar in this period (Figure M). However, the epididymal head was suffering from thickening and fibrosis in connective tissue, sloughed in epithelia of epididymis duct and destruction and rupture in epididymal wall duct (Figure N).

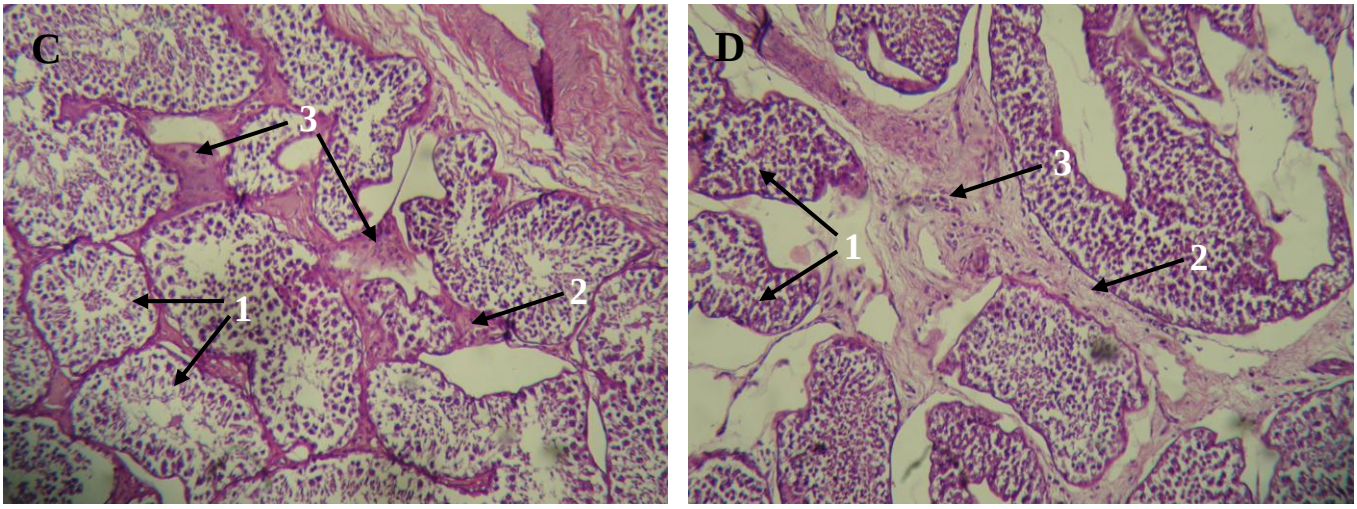

Figure (C&D) Section in testicular parenchyma after one month (40X)

1) Atrophied in the seminiferous tubules.
2) Thickness in interstitial connective tissue.
3) Slightly proliferation of Laydic cells.

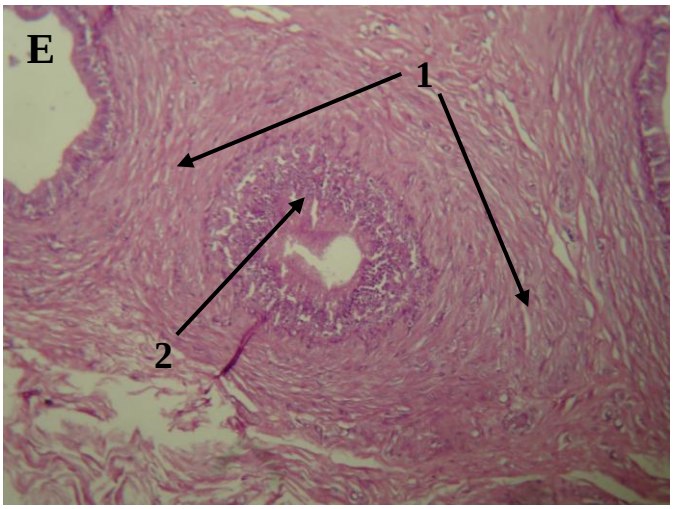

Figure (E) Section in tail of epididymis after one month (40X)

1) Hyper atrophy of interstitial connective tissue.
2) Degeneration in epithelia.

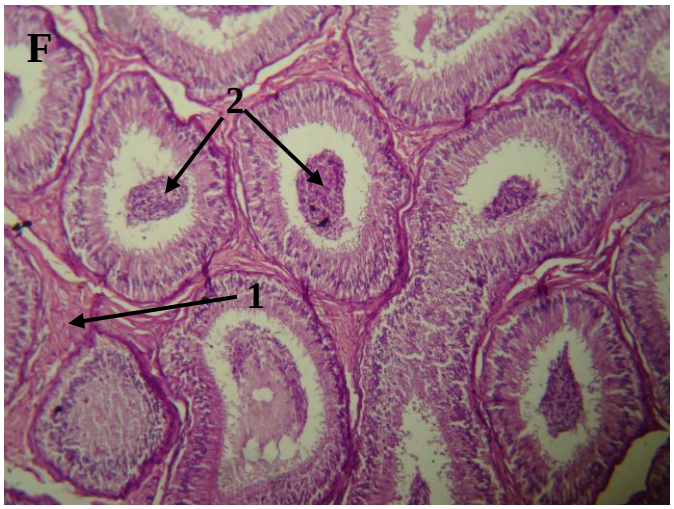

Figure (F) Section in head of epididymis after one month (40X)

1) Thickness in connective tissue.
2) Accumulation of mass from sperms in lumen of epididymal duct.

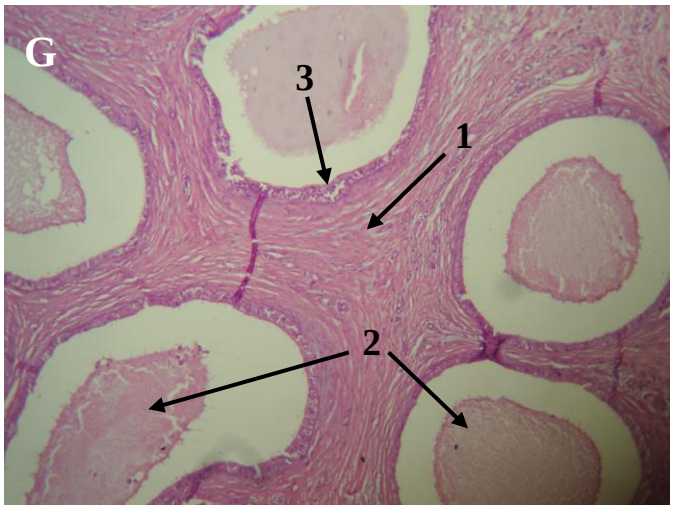

Figure (G) Section in body of epididymis after one month (40X)

1) Thickness and fibrosis in connective tissue.
2) Large mass from sperms in lumen of duct.
3) Degeneration in epithelia.

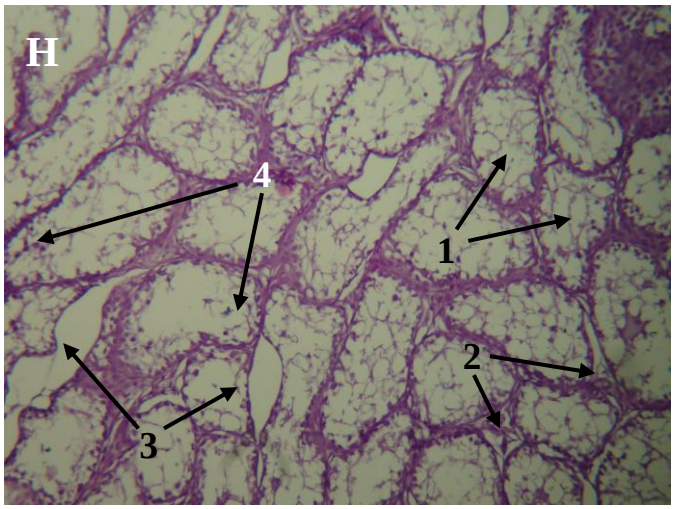

Figure (H) Section in testicular parenchyma after three months (40X)

1) Atrophied in the seminiferous tubules.
2) Damage in connective tissue.
3) The seminiferous tubule is lined by basal membrane.
4) Degeneration and Necrosis in germinal and Sertoli cells.

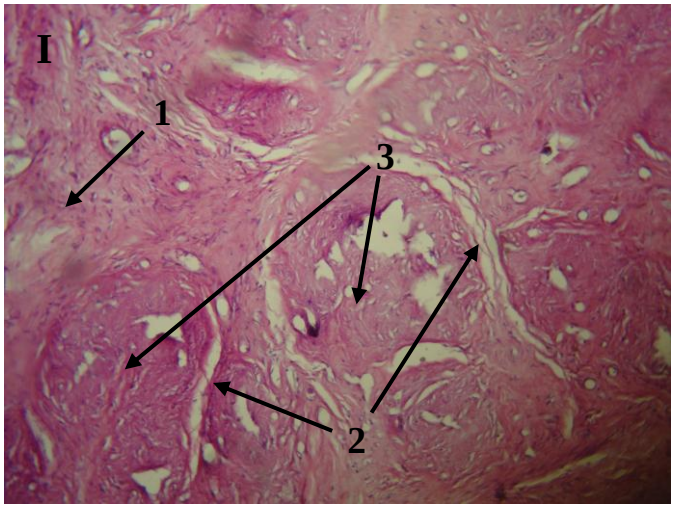

Figure (I) Section in tail of epididymis after three months (40X)

1) Hyper atrophy of interstitial connective tissue.
2) Sloughing in epithelia of epididymis duct.
3) Embedding of tissue.

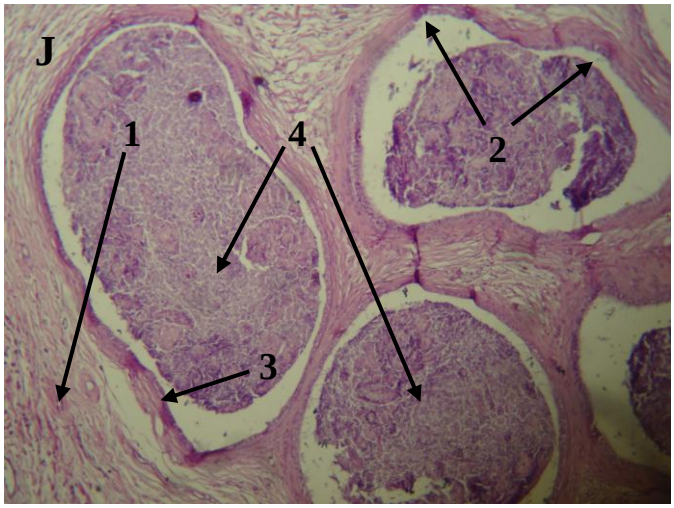

Figure (J) Section in head of epididymis after three months (40X)

1) Thickness in connective tissue.
2) Atrophied lesion in Basal and principal cells of duct.
3) Sloughing in epithelia of epididymis duct.
4) Accumulation of mass from sperms in lumen of epididymal duct.

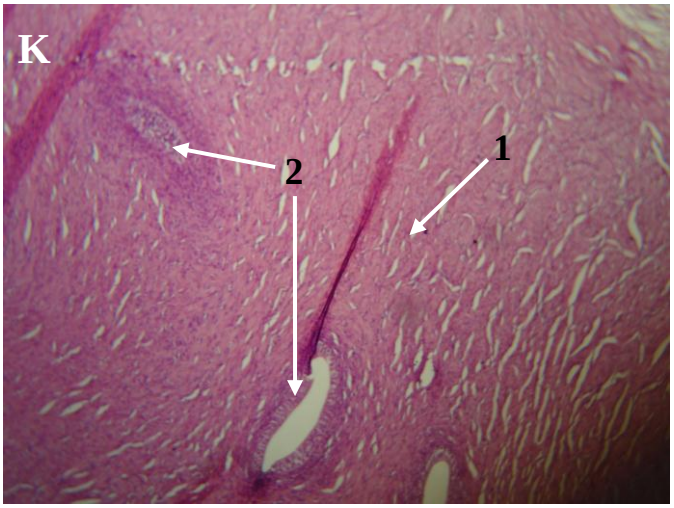

Figure (K) Section in body of epididymis after three months (40X)

1) Thickness in connective tissue.
2) Obstruction and narrowing of epididymal duct.

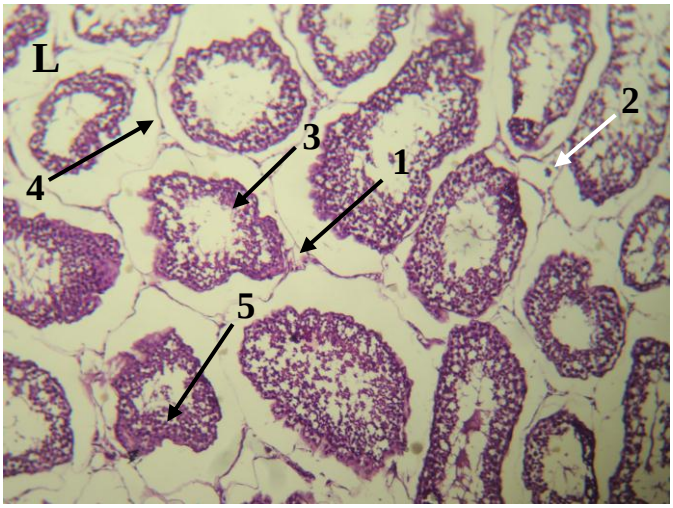

Figure (L) Section in testicular parenchyma after six months (40X)

1) Damage in interstitial connective tissue.
2) Decrease in the number of Leydig cells.
3) Atrophied of seminiferous tubules.
4) Separated of seminiferous tubules from connective tissue.
5) Degeneration and necrosis of germinal and sertoli cells.

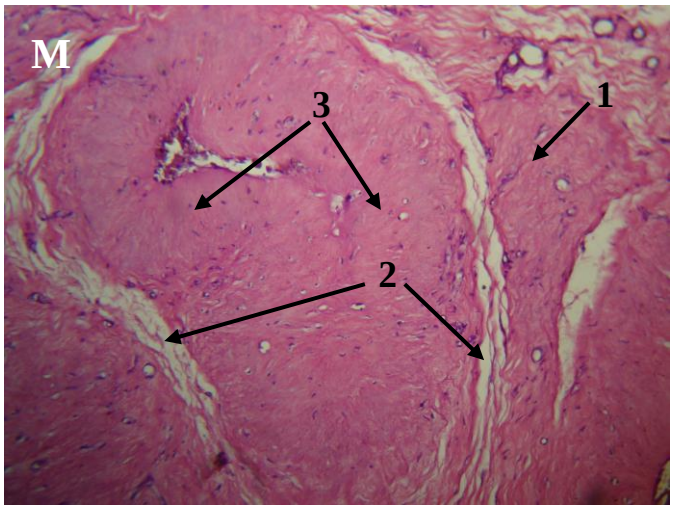

Figure (M) Section in tail of epididymis after six months (40X)

1) Hyperatrophy of interstitial connective tissue.
2) Sloughing in epithelia of epididymis duct.
3) Embedding of tissue.

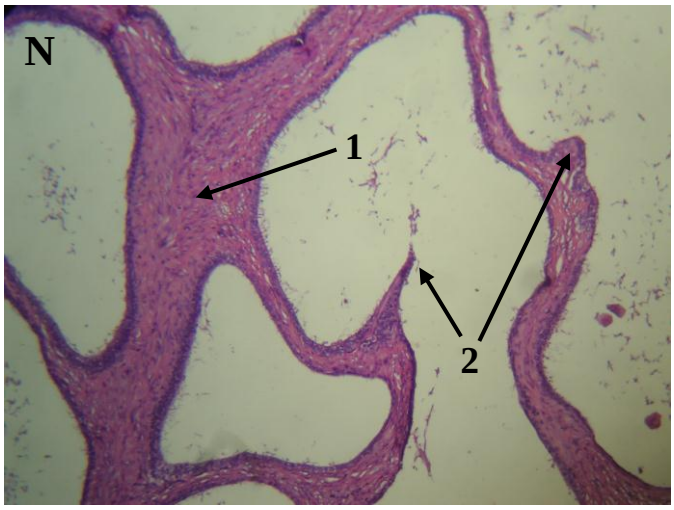

Figure (N) Section in head of epididymis after six months (40X)

1) Thickness in connective tissue.
2) Damage and rupture in epididymal wall duct.

Discussion:

The animals showed longest time of sexual desire after one week of epididymectomy (12.3±1.8), due to pain, fear and stress factors of the operation while in 2, 3 and 4 weeks after operation returns to normal, because of the absence of these factors. This result is accord with the result obtained by Plant et al. (10).

The value of sperm concentration was continueally decreasing with increasing in length of time after the operation because of the blockage of sperms passage. This sign agreed with Janett et al. (11).

Rams were suffered from severe pain and swelling (edematous) and redness in operation site for 4 days. These signs are similar to that obtained by Al-Maghrebi et al. (12).

Swelling in the body and the head of the epididymis above the blockage area was observed through palpation. This swelling is simple in the third day and increased in inflation later, so it is possible to discriminate between swelling in the body and head of the epididymis by eye from outside the scrotum when moving the testicle by hand after (10-14) days of the operation. Enlargement and swelling lesions upper of the blockage area of the epididymis was observed after castration. These signs agreed with the result obtained by Plant et al. (10).

The severity of histopathological changes was increased from atrophied in the seminiferous tubules, thickness in interstitial connective tissue, slightly proliferation of Laydic cells to the seminiferous tubules separation from connective tissue, degeneration and necrosis of germinal and sertoli cells, decrease in the number of Leydig cells and damage in interstitial connective tissue. These signs are agreed with that obtained by McCaughey and Martin (8).

The tail of epididymis suffered from hyper-atrophy of interstitial connective tissue, sloughing in epithelia of epididymis duct and embedding of tissue. These signs occurred because the blood supply was arrested towered this part.

The head suffered from more thickening in connective tissue, atrophied lesion in basal and principal cells of duct, and accumulation of large mass of sperms in lumen of epididymal duct which leads to rupture the epididymal wall duct. These signs agreed with the results obtained by Nariculam et al. (13).

Conclusion:

Various damages in testicular and epididymis structure have obvious drastic influence as decreasing sperm concentration toward zero at around one month after the operation. However, the time of sexual desire may recover after one month.

Partial caput epididymectomy causes severe histopathological changes in testicular tissue of teaser rams. These include thickening of the basement membrane of seminiferous tubules, degeneration and necrosis of spermatogonia and sertoli cells. Some seminiferous tubules may appear only with covering basement membrane and proliferation of Leydig cells and decrease in the number of these cells at later periods. The epididymis may shows enlargement and swelling lesions, hyper atrophy of interstitial connective tissue, epithelial degeneration, fibrosis and large mass of sperms in the lumen.

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