Histopatholgical changes in the mice model of surgical unilateral cryptorchidism

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Abstract

This study was done on 20 male mice (35 – 45) days with weight of (18 – 20) grams divided into four groups, each group contains five animals. The first group regarded as control and remain intact. The second, third and fourth group were subjected to experimental unilateral cryptorchidism to render them cryptochild by putting the testes inside the abdominal cavity and suture the inguinal canal. Second group were killed after 10 days from the operation, the third group were killed after 20 days & fourth group were killed after 30 days. This study confirms that intraabdominal cryptorchid testes are impaired spermatogenesis due to abnormal localization, decrease in testicular volume in the cryptorchid group, seminiferoustubular atrophy, basnet membrane thickening, germ cell loss and spermatogenic arrest were more evident with time being highest at the 30 days.

Introduction

In a majority of mammals the fetal testis migrates from the posterior pole of the kidney and pass through the abdominal wall to reach the scrotum (1). When the congenital malposition result in retention of the testicle any where along the rout of descent it is known as cryptorchidism (2). Cryptorchidism abnormal testicular descent leading to the retentions of one or both testes outside the scrotum (3). Unilateral cryptorchidism is more common than bilateral one in domestic animals spesially in horse (4). In unilateral cryptorchidism the scrotal testis undergoes compensatory hypertrophy and generally functions normally although impaired spermatogenesis and abnormal sperm morphologies are occasionally detected in unilateral cryptorchid (5). The aim of present study to observe there no evidence of cancerous abnormity and the effect of unilateral cryptorchidism on tissues.

Materials and Methods

The 20 mature male Albino mice were housed at the animal house of the college of veterinary medicine in cages. They were divided into four groups each group containing five animals, the first group served as control and the others were killed after 10, 20 and 30 days after surgical operation of experimental unilateral cryptorchidism respectively. Testes specimens were collected at necropsy them fixed at 10% formalin with paraffin, sectioned and stained with haematoxylin and Eosin stain for examined by light microscope (6). Surgical operation (Experimental unilateral cryptorchidism):- After induction of an anesthesia with intraperitoneal injection of ketamine 100mg/kg pluse Xylazine 1mg/kg the male mice was placed in supine position and clipping and shaving the area of operation was don disinfection with alcohol then vertical Medline incision of about 2cm long was made in the abdomen just above the base of the penis. One testis was palpated and pushed into the abdomen then internal inguinal canal was closed with 4/0 vicryl suture to prevent testicular descent abdominal sheath. Muscles were closed without further intervention then skin is sutured with non absorbable silk by interrupted stiches, systemic of oxytetracyclin was injected for five successive days.

Result

A decrease in testicular volume was seen between cryptorchid testes and controls at each examination group. The histologic findings of the control group as normal. Undescended testes group was histologically characterized by early maturation arrest, decreasing seminiferous tubule diameter and thickening of basal
membrane. These abnormal histological changes were first observed at 10 day and were more prominent at 30 day. The most histological abnormality seen at 30 day was severe spermatogenetic arrest in underscended testes.

Fig 1 control mouse testis normal appearance of somniferous tubules and germinal epithelium (H & E) X 40 (normal diameter of S.T. 80.5 ± 2.5)

Fig 2: Abnormal somniferous tubules shape at 10 days group X 10 (abnormal diameter of S.T. 40.4 ± 1.2)

Fig 3: The spermatogenic cells not clear and aggregated in the lumen of seminiferous tubules as degenerating and necrotized cells and thickening in the wall of tubules at 10 day X 100
Fig 4: Spermatogenetic arrest with accumulation of neutrophiles at 10 day X 40 (H & E)

Fig 5: Seminiferous tubules like structure and sloughing of spermatogonia and sertoli cell in the wall of seminiferous tubules in 20 days X4

Fig 6: Complete loss of spermatogenic cells and proliferation and dark staining of interstitial cell X40 (H & E)
Fig 7: Present of adipose tissue in 20 days X4

Fig 8: Remaining of interstitial cells fibers in 20 days X4

Fig 9: Atrophied seminiferous tubules only the degenerated sertoli cell nuclei, the spermatogenic cells are degenerated leaving ghosts of there cell membranes interstitial cells are hyper trophied and showed tiny vacuoles X 40 (H & E)
Discussion

The result of this experimental study noticed both macroscopic and microscopic change in cryptorchid testes. Exposure to higher temperatures due to abnormal position was accused the cause of histological and spermatogonetic defects in several studies (7,8,9). In this animal mode of cryptorchidism, testicular development was arrested, and spermatogenesis was impaired dramatically as well. Both macroscopic and microscopic changes in the unilateral cryptorchid testes were readily apparent at 10 days and become more obvious in the 30 days. Penson et al also recognized similar changes in testicular volume in their animal model (7). Following experimental unilateral cryptorchidism deformation of the germinal cell in the testis in the cryptorchid testes (10). The objective of this study was to observe there were no evidence of cancerous abnormality, this not agree with other research that were found the risk of cryptorchid developing cancer has been estimated up to 40 times higher than of a scrotal testes (11). In several studies propose that the histological abnormalities observed in the cryptorchid testes are due to a primary cell alteration (12,13). Others propose an autoimmune etiology as the causative factor in the development of these histological changes in cryptorchid testes (14). The generally accepted explanation for the deterioration is the higher temperature in the abdominal cavity (15). This view is supported by the tubular changes following prolonged febrile illness in man and other experimental studies (16). The descent of only one testis is also caused infertility (17). The significant unilateral decrease in the testicular weight and volume in the cryptorchid rats indicates testicular dysfunction involving both spermatogenesis and steroidogenesis (18). There are several theories in caring endocrine dysfunction, interference with blood supply, gonadal dysgenesis in cryptorchid testis lead to degeneration (19). Administration of systemic testosterone is effective in descent of testis and any decrees in this hormone lead to cryptorchidism (20).

Reference


دراسة التغيرات المرضية النسجية للفئران ذات التهجير التجريبي لحدي الخصائص

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الخليفة

أجريت هذه الدراسة على 20 فأر ذكر وقد قسمت الحيوانات إلى 4 جماعات كل 5 فئرًا . المجموعة الأولى اعتبرت مجموعه سلطفة، أما المجموعة الثانية والثالثة والرابعة فقد أجريت لها عملية التهجير الجراحي التجيري لأحدي الخصائص، حيث تم وضع أحدي الخصائص في داخل التجويف البطني وتم خيامته الفحصية. المجموعة الثانية قلّت بعد 10 أيام من إجراء العملية، أما المجموعة الثالثة قلّت بعد 20 يوم من إجراء العملية والرابعة بعد 30 يوم من إجراء العملية، وقد تم التحصيل على النتائج التالية:

- توقف عملية تكوين النطف.
- صغر حجم الخصية الذي أجريت لها عملية التهجير.
- ضمور المحويصات المنوية وختان الجدار القاعدي.
- عدم تكون الخلايا الجنوية المنوية للنطف (Germ Cell).
- توقف مراحل تكوين النطف (Spermatogenesis).

بعد 20 يوم من إجراء العملية.