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Clinical and ultrasonographic findings in rams with scrotal enlargement

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Abstract

The present study aimed to investigate the clinical, ultrasonographic, and serological findings of scrotal enlargement in Iraqi Awassi rams in Nineveh governorate, Iraq. A total of 172 rams were brought to the Veterinary Teaching Hospital, College of Veterinary Medicine, and a private clinic by the owners from different areas of Nineveh governorate between 1/4/2021 to 1/7/2021. All animals underwent ultrasonographic and serological examinations. The animals were 18 months - 6 years of age, with body condition scores ranging between 3-4 (on a scale from 1-5). The animal case history detailed was recorded, and clinical, with the ultrasonographic investigation, was done; a blood sample was taken to the lab and checked for *Brucella* spp by the Rose Bengal test. results revealed a total of 172 rams studied cases were 57 events of scrotal enlargement in study 57/172 (33.13%). Scrotal enlargement was associated with orchitis 29/57 (50.87%), peri-orchitis 12/57 (20.05%), and epididymitis 11/57 (19.29%). The other assorted finding was scrotal hernia 2/57 (3.50%), scrotal hematoma 1/57 (1.75%), hydrocele 1/57 (1.75%), and unilateral cryptorchidism 1/57 (1.75%). Orchitis 29 cases were associated with no abscess formation on 9/29 (31.03%), single abscess formation on 8/29 (27.58%), and multiple abscesses formations on 12/29 (41.37%). Serological tests of males with scrotal enlargement for *Brucella* spp were in frequency with other unknown cases which positive to *Brucella* were 37/57 (64.91%) cases and 22/57 (38.59%) negative cases, respectively. In conclusion, orchitis, peri-orchitis, epididymitis, and other male scrotal enlargement need more investigation and studies due to their effect on male fertility. *Brucella* spp was the main cause of male reproductive system infection, and ultrasonography was very effective for diagnosing infection when connected with lab data results.

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Introduction

The Male animal is considered a source of male gamete (1) which can be used for natural or artificial insemination purposes. Male reproductive system is exposed to many serious infections or disorders during the animal lifespan which consider a pathological conditions like trauma, injuries, toxicities, lack of libido and inflammations (2,3). In Northern Iraq, breeding season start at begging of June

(4), short time before breeding season, owner and clinician involved with male breeding soundness to prepare rams to be ready and healthy for ewes mating (5). Previous report in sheep with different areas investigated causes of scrotal enlargement, orchitis and infectious diseases accompanied with pathological condition like in Awassi rams, the frequency of orchitis, peri-orchitis and epididymitis were 47.4, 21.1 and 14.1% respectively which reported by Ali *et al.* (6) in Saudi Arabia. In Iraq, Al-Hankawei *et al.* (7),

found that *Brucella ovis* responsible about 12/250, 4.8% of orchitis and epididymitis in total 250 cases were clinical diagnosed without referring to percentage of infection of the rest cases. There were similar study referring brucella infection in Erbil city/ Northern Iraq (8) and Pakistan (9), Minas Gerais, Brazil (10) as a mean cause of public infection. Today, ultrasonography become an important assisted tool for diagnosing and prognosis of various pathological condition in animal practice (11,12). It appears to be useful for diagnosing of intra-scrotal abnormalities, low fertility causes for breeding soundness examination (13-17).

To the best of our knowledge, there are a limited information dealing with causes and infection orchitis or scrotal enlargement in Iraqi Awassi rams, therefor, the purpose of present study was to investigate the clinical, ultrasonographic and serological finding of scrotal enlargement conditions.

Materials and methods

Ethical approve

The study was performed after obtaining of approval of ethical Committee of Medical Researchers at College of veterinary Medicine, University of Mosul um.vet.2021.058.

Animals of the study

A total of 172 rams were brought to the Veterinary Teaching Hospital, College of Veterinary Medicine and some private clinics form different area of Nineveh governorate between 1/4/2021 to 1/7/2021. All animals were undergoing clinical, and serological, ultrasonography examinations. The animals were 18 month- 6 years of age with body condition score that ranged between 3-4 (on scale from 1-5). Some of these animals have pervious report of successful mating and successful offspring of lambs and some of them had a history of scrotal enlargement up to 6 months earlier. Rational percentage of ram/ewe were 1:20 of hosted animals, barley and hay were main ration for animal feeding.

Clinical and laboratory tests

A detailed case history of each male includes general inspection, previous treatment if presented were recorded. The clinical examination includes examine the external reproduction part including inspection and palpation of scrotum, perpetual orifice, mobility of peins and copulatory organs inside perpetual sheath for any signs of fibrosis, lesions, afflictions, abnormal structures, trauma, adhesion and injuries and pain reflex. Scrotal examination includes measurement of scrotal circumference, constancy, mobility of the testis, asymmetry of the both testicles, epididymis and other scrotal contents with viewed enlargements if noticed. Ultrasonographic examination of the testis were

carried out with sagittal, transverse, frontal and oblique planes (was perform also to assessment of epididymal tail) to check testicular echo-texture by using ultrasound (kx5100vet, portable ultrasound machine, KeeboMed, USA), examined area was shaved if necessary and ultrasound coupling gel was applied. Castration or hemicastration was performed in some cases under hygienic conditions. Testicular/ epididymis content aspiration was also carried out under aseptic condition by using 18 g aspiration needles in some cases.

Blood samples and testes for *brucella* spp

A 10 blood samples obtained from jugular vein was collected in tube without coagulant; sera were harvested after centrifugation at 3000 xg for 15 minutes. The superannuated serum was collected. Rose Bengal test as a rapid slide agglutination assay were performed for detect antibody against brucellosis.

Results

Results of clinical and ultrasonographic investigation in present study revealed a total 57 (33.13%) cases of scrotal enlargement from a total of 172 Awassi rams were examined. Scrotal enlargement was associated with orchitis 29/57 (50.87%), peri-orchitis 12/57 (20.05%) and epididymitis 11/57 (19.29%). The other assorted finding was scrotal hernia 2/57 (3.50%), scrotal hematoma 1/57 (1.75%), and hydrocele 1/57 (1.75%) and unilateral cryptorchidism 1/57 (1.75%). Orchitis 29 cases was association with no abscess's formation 9/29 (31.03%), single abscess formation 8/29 (27.58%), and multiple abscesses formation were 12/29 (41.37%) (Table 1).

Table 1: Clinical and ultrasonographic findings

Condition	n (%)
Orchitis	29 (50.87)
Peri-orchitis	12 (20.05)
Epididymitis	11 (19.29)
Scrotal hernia	2 (3.50)
Scrotal hematoma	1 (1.75)
Hydrocele	1 (1.75)
Unilateral cryptorchidism	1 (1.75)

In unilateral orchitis, the other testis found atrophied with different degrees and content of affected testis were aspirated by sterile syringe were found thick heavy purulent material of yellowish, greenish or reddish color were observed, this finding approved by ultrasonographic examination were show testicular abscess, showing hypoechoic and hyperechoic and sperm granuloma at advance stage areas. Hard constancy, atrophy of the testis, and significant connective tissue development in the tunica

surrounding the testis are all symptoms of peri-orchitis. Epididymitis observed mainly at the tail of the epididymis 10/12 (83.33%), head of epididymis was 2/12 (16.66%). Epididymitis accompanied with abscess 11/12 (91.66%) (Figures 1-8).

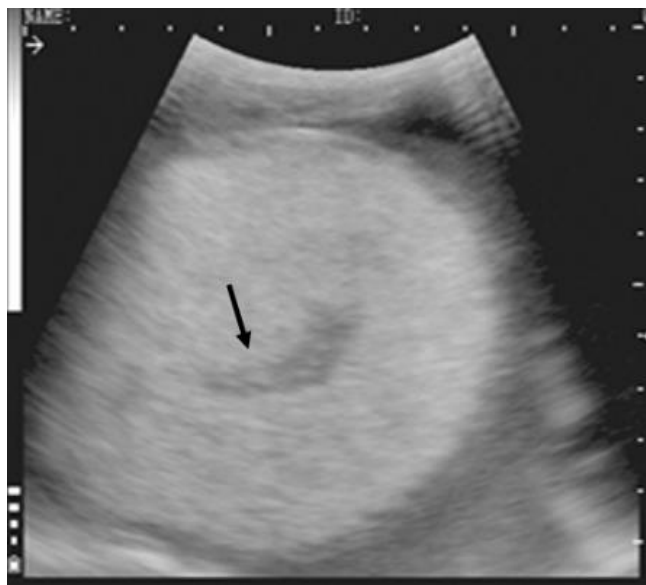


Figure 1: Degeneration of scrotum, hypoechoic heterogeneous echotexture of testis (black arrow).

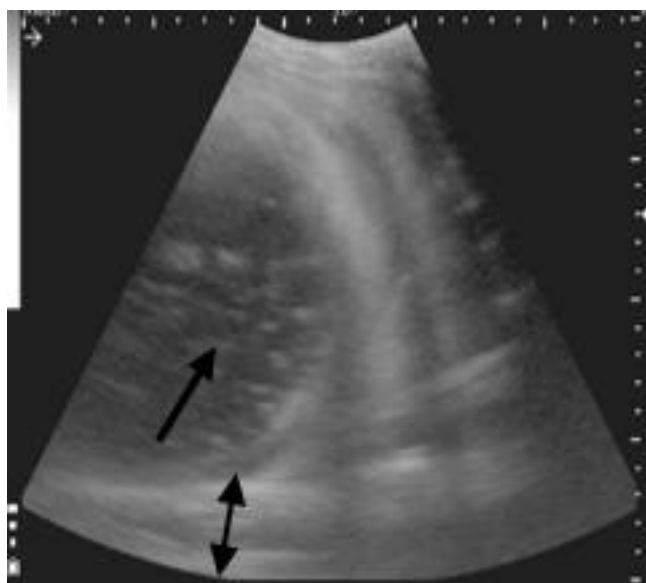


Figure 2: Epididymitis, white small spots of inflammatory cells (one head black arrow), thickened of testis wall (double head black arrow).

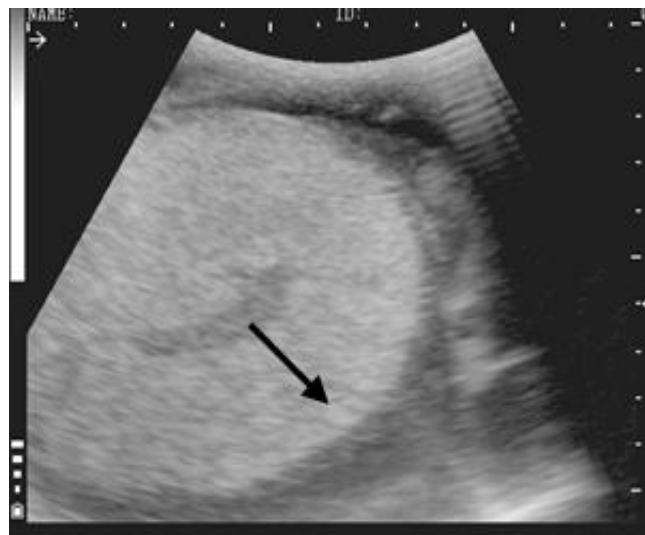


Figure 3: Orchitis in ram, pus in the testis (black arrow).

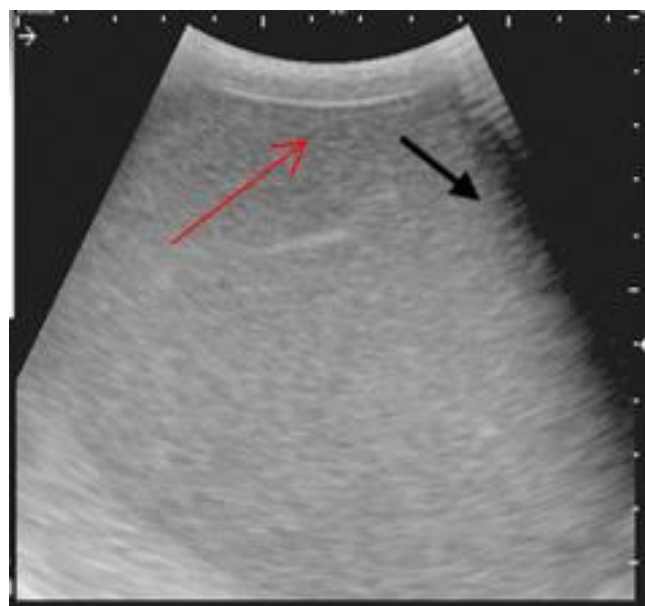


Figure 4: Orchitis in ram, micro-abscesses (black arrow) with increase wall thickness (red arrow).

Scrotal hernia was soft in palpation with internal viscera content recorded in two cases. Hydrocele constancy was soft and clear fluid in scrotal sac. Scrotal hematoma was discovered in one case, this male has history of mechanical injuries sustained during fights with other males. After surgical removed, the size of the testis was somewhat reduced, and blood vessels were ruptured. Unilateral testis was recorded in one ram, the remaining testis was slightly big and the animal have a history of successful mating and lamb producer, this male has unilateral cryptorchidism

since birth and the remaining testis was still in abdomen. Serological tests of male with scrotal enlargement for *Brucella* spp were in frequency with another unknown cases which negative to *Brucella* (Rose Bengal) 37/57 (64.91%) and 22/75 (38.59%) respectively (Table 2).



Figure 5: Hydrocele.

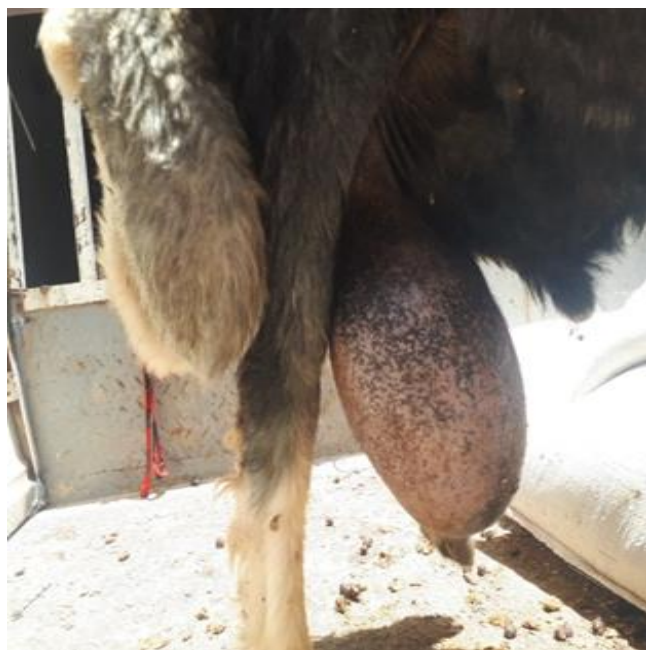


Figure 6: Ram with enlargement of both testes.



Figure 7: hypoechoic areas of the testis tissue.

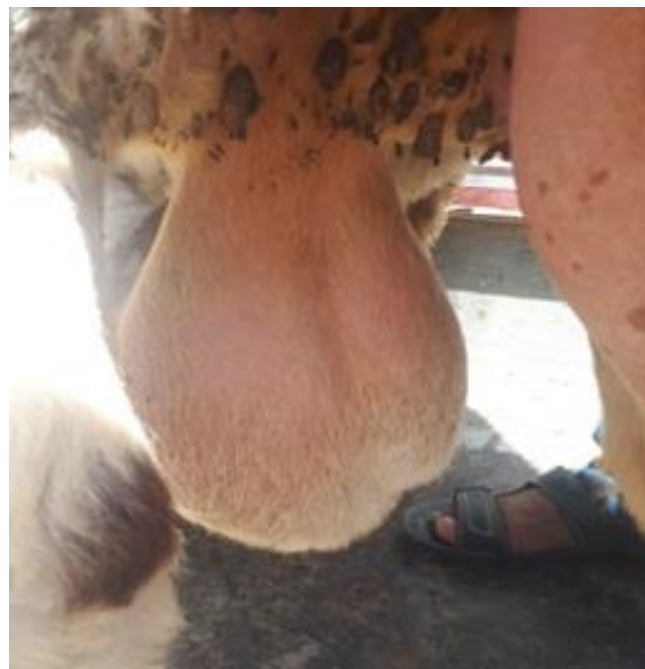


Figure 8: Ram with swelling of one testis.

Table 2: Serum results of toxoplasmosis and brucellosis and other causes of scrotal enlargement of Awassi rams

Condition	n (%)
<i>Brucella</i> spp (positive)	37 (46.91)
Other causes (negative)	22 (38.59)

Discussion

Inflammation of testis/epididymis are the main causes of scrotal enlargement with Incidence of orchitis, peri-orchitis, epididymitis, hydrocele, scrotal hernia, scrotal hematoma and unilateral cryptorchid testis which were 50.87, 20.05, 19.29, 1.75, 3.50, 1.75 and 1.75% respectively, these data in agreements with Ali *et al.* (6) who approved same results in Awassi rams in Saudi Arabia/ Al-Qassim region which were 47.4, 21.1, 14.1, 10.5, 6.5 %, respectively but without records of incidence of scrotal hematoma and unilateral cryptorchidism. The general similarities of previous research in Saudi Arabia and our present study may related to same animal husbandry conditions and same animal housing circumstances with similarities in time of reproductive season.

Orchitis is most commonly discomfort caused by infection or trauma. Bacterial infections may develop hematogenously or occasionally by retrograde movement from infected accessory sex glands. Peri-orchitis or epididymitis may coexist and testicular enlargement is due to edema that accompanies the inflammatory reaction leading to increase scrotal circumference (18,19). Brucellosis, is a small demanding gram-negative coccobacillus bacterium of the genus *brucella* (7,20,21), the main sources of infection with *brucella* spp. were fetal fluid, vaginal discharge and placenta (6). After entrance of the body through contaminated food, bacteria successful to cross host immunity band after bacteremia, bacteria infected inguinal lymph node and cause orchitis, epididymitis and arthritis (22,23). there were another bacteria or infection may be leads to enlargement of scrotum, orchitis or epididymitis in small ruminants like *Archanobacterium pyogens* which was detected as causes of orchitis and pathogenic for ovine gentilia in animals (6). Moreover, *Trypanosoma brucei*, *Salmonella enterica* subsp. *Diarizonae*, *Chlamydia* spp also isolated from those cases of orchitis and peri-orchitis infection in a mature ram (6,24-27).

Epididymitis is an inflammation of the coiled tube (epididymis) at the back of the testicle that stores and carries sperm. *Brucella ovis* which is commonly termed contagious epididymitis (CE) and damage ram fertility due to epididymal, testicular, and accessory sex gland modifications (28) and chronic epididymitis leads to formation of spermatocele sperm granuloma and abscessation (6,29,30). *Actinobacillus seminis*, *Histophilus ovis*, *Escherichia coli*, *Corynebacterium psudeotuberculosis* and *Pasturella hemolytica* were approved in previous reports as a pathogenic and infectious causes leads to orchitis and epididymo- orchitis in young and mature rams and bucks (27). Scrotal hernia is primarily an acquired disorder brought on by trauma; nevertheless, it is possible

to have a congenital susceptibility and surgical correction is the best way to treated these cases (31).

Unilateral cryptorchidism in one male was a disorder which interfere with male fertility (32,33), but the recorded case in present study was a pervious case history of successful lamb product and clinical examination show no signs of subfertility or lack of libido. Ultrasonography is a very useful tool for the diagnosis of many male disease or abnormal condition, like orchitis, peri-orchitis, epididymitis, hydrocele, scrotal hematoma, trauma, testicular injuries, torsion, scrotal hernia, varicoele, and malignant diseases. Echotexture analysis by ultrasound-video analysis could be a valuable tool for assessing Ram, Buck and Bull fertility (34).

The incidence of *brucella* spp infection in this study which recorded and associated with scrotal enlargement was 46.91% while another cases was 38.59%, these result was in same range data reports by Al-Majali *et al.* (35) which was 47.6% in Southern Jordan and higher than another result recorded 31.0% in Basra/Southern Iraq (36), however, incidence may differ because of some factors may interfere like sample size, number of animals counted, area of animals, season, climate effect, animal husbandry condition, type of kits and lab protocols, animal immune itself with stress condition, but; results of present study rise high incidence of *brucella* spp infection and this need more investigation and attention in the future (37-40).

Conclusion

In conclusion, orchitis, peri-orchitis, epididymitis and other male scrotal enlargement need more investigation and studies due to its effect on male fertility. *Brucella* spp were main causes of male reproductive system infection and ultrasonography was very effective tools for diagnosis infection when connected it's with lab data results.

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Conflict of Interest

The authors declare that no conflict of interest exists.

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الكشف السريري وبالموجات فوق الصوتية في الكباش المصابة بحالات تضخم كيس الصفن

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الخلاصة

الغرض من هذه الدراسة هو استيضاح الشواهد السريرية والمصلية، وإجراء الفحص بالموجات فوق الصوتية لتضخم كيس الصفن في الكباش العواسية العراقية في محافظة نينوى/ شمال العراق. فحص مائة واثان وسبعون كبشا جلبت من قبل من قبل أصحابها إلى المستشفى التعليمي البيطري / كلية الطب البيطري/ جامعة الموصل وأيضاً بعض العيادات الخاصة من مناطق مختلفة من محافظة نينوى للفترة ما بين ٢٠٢١/٤/١ إلى ٢٠٢١/٧/١. وقد تراوحت أعمار الحيوانات المصابة ما بين ١٨ شهرا و ٦ سنوات مع درجة حالة جسدية تراوحت ما بين ٣-٤ (على مقياس من ١-٥). وتم تسجيل تاريخ حالة الحيوانات المرضية والسريرية، مع إجراء فحص بالموجات فوق الصوتية، وأخذت عينات من الدم، وأرسلت إلى المختبر للتحقق من وجود جراثيم البروسيلا بواسطة اختبار الـ روز- بنغال. كانت النتائج الإجمالية لمائة واثان وسبعون كبشا هي سبعة وخمسون حالة تضخم في كيس الصفن ١٧٢/٥٧ (٣٣,١٣٪)، وارتباط تضخم كيس الصفن بالتهاب الخصية ٥٧/٢٩ (٥٠,٨٧٪)، والتهاب محيط الخصية ٥٧/١٢ (٢٠,٠٥٪)، والتهاب البربخ ٥٧/١١ (٩,٢٩٪). أما النتائج المتنوعة الأخرى فكانت فقت في كيس الصفن ٥٧/٢ (٣,٥٠٪)، وجود الورم الدموي في كيس الصفن ٥٧/١ (١,٧٥٪)، والقيلة المائية ٥٧/١ (١,٧٥٪)، وحالة الخصية المحتبسة أحادية الجانب ٥٧/١ (١,٧٥٪). أرتبط التهاب الخصية ٢٩ حالة بعدم وجود خراجات ٢٩/٩ (٣١,٠٣٪)، وتكون خراج مفرد ٢٩/٨ (٢٧,٥٨٪)، وتكون خراجات متعددة ٢٩/١٢ (٤١,٣٧٪). كانت الاختبارات المصلية للذكور المصابة بتضخم كيس الصفن متواترة مع حالات أخرى غير معروفة. وكانت نسبة الإصابة بالبروسيلا ٥٧/٣٧ (٦٤,٩١٪) مصاب، و ٥٧/٢٢ (٣٨,٥٩٪) غير مصاب على التوالي. يستنتج من الدراسة الحالية أن التهاب البربخ وتضخم كيس الصفن يحتاج إلى مزيد من الاستقصاء والدراسات بسبب تأثيره على خصوبة الذكور. وان جراثيم البروسيلا هي من الأسباب الرئيسية لإصابات الجهاز التناسلي الذكري. تبين أيضا أن الفحص باستخدام الموجات فوق الصوتية من الأدوات الفعالة لتشخيص العدوى عند ربطها ببيانات النتائج المختبرية.