Sudan University of Sciences and Technology

College of Graduate Studies

Study of Scrotal Sac Swelling by Ultrasound

دراسة تورم كيس الصفن باستخدام الموجات فوق الصوتية

A Thesis Submitted in Partial Fulfillment For The Requirement Of M.Sc. in Medical Diagnostic Ultrasound

By:

Ala Aldein Nabil Ibrahim abdo

Supervisor:

Dr. Asma Ibrahim Ahmed Mohamed

2019

الاية

قال تعالى:-

(قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا ۖ

إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ)

صدق الله العظيم

سورة البقرة الاية (32)

Dedication

To the soul of my father...

To my darling mother...

To my lovely family...

To all my friends....

Acknowledgement

I hereby thanks A Allah the merciful for continuous successful used the offer throughout every step in my life.

Most grateful appreciations are owed to my supervisor Dr. Asma for his good guidance and help through this thesis.

My gratitude thanks extended to everyone who supported me and provided me any type of help through my study.

Abstract

This study about study of Scrotal sac swelling using Ultrasonography

The aims of the study were to establish the causes of scrotal swelling in the population and to evaluate the relationship between clinical, demographical and sonographic findings 34 patients with age range between 1-80 years presented with scrotal swellings were examined by high resolution real time Toshiba ultrasound machine using 5-12 MHZ linear probe during the period from March 2018 to January 2019 in Omdurman military hospital.

The largest age effected by scrotal swelling (16-30 y) and the lowest age effected by scrotal swelling (more than 75y). The largest weight effected by scrotal swelling (54-75 kg) and the lowest weight effected by scrotal swelling (12 -32kg). The largest occupation effected by scrotal swelling is officer and the lowest occupation effected by scrotal swelling is child.

Married patient 58.8% more effected than unmarried patient 41.2%. The largest cause which causes scrotal swelling is scrotal hydrocele 50%. The correlation between age and final scrotal swelling causes is weak, no significant at P value =0.137. The correlation between weight and final scrotal swelling causes is weak, no significant at P value =0.166. The correlation between occupational and scrotal swelling cases is strong correlation and significant at P value =0.005. The correlation between marital status and scrotal swelling causes is weak correlation and no significant at P value =0.664.

this study recommended to Further studies should be carried out in this field on many aspects such as increasing the number of patients, to show the relation between scrotal swelling and causes, comparing between the role of U/S scanning and other diagnostic tools.

الملخص

هذه الدراسة حول دراسة اسباب تورم كيس الصفن بواسطة استخدام الموجات فوق الصوتية , الهدف من هذه الدراسة هو إثبات أسباب تورم كيس الصفن وتقييم العلاقة بينه في العلامات ألسريريه ومعطيات الموجات فوق الصوتية في 34 مريض من عمر 1 إلى عمر 80 سنه حضروا إلى قسم الموجات فوق الصوتية مع ورم في كيس الصفن تم الفحص بواسطة جهاز توشيبا محول الطاقة 5-12 ميقا هرتز من الفترة من مارس 2018 إلى الفترة يناير 2019 في المستشفى العسكري العام بأم درمان

أكثر الأعمار عرضه للورم في كيس الصفن من عمر 16 -30 سنه واقلهم عرضه أكثر من عمر 75 سنه , وأيضا أكثر الأوزان عرضه لورم كيس الصفن من وزن 54 إلى 74 كيلوجرام واقلها تأثرا وزن 12 إلى 32 كيلوجرام

أكثر المرض عرضه لورم كيس الصفن الضباط واقلهم الأطفال وأيضا المتزوجين أكثر عرضه لورم كيس الصفن واقلهم عرضه الغير متزوجين.

وجد من خلال الدراسة أن استسقاء الخصية أكثر أسباب ورم الخصية .حيث وجد أن لا علاقة بين ورم الخصية وعمر المريض في نقطه احتمال 0.37 وأيضا لا علاقة بين وزن المريض وورم كيس الصفن في نقطه احتمال 0.166 ولكن يوجد علاقة قويه بين وظيفة المريض مع ورم الخصية عند نقطه احتمال 0.005

أيضا لا يوجد علاقة بين ورم كيس الصفن مع الحالة الاجتماعية للمريض عن نقطه احتمال 0.664 . أوصي بمزيد من الدراسة حول أسباب ورم الخصية وذالك بزيادة عدد المرضي وأيضا استخدام أجهزه الموجات الملونة والفحوصات المعملية.

List of Contents

The Contents		Page
الاية		I
Acknowledgement		II
Dedication		III
Abstract		IV
الملخص		V
Lists of Contents		VI
List of Tables		VIII
List of Figures		IX
Abbreviation		X
Chapter one Introduction		
1.1	Introduction	1
1.2	The problem of the study	4
1.3	Objectives of the study	4
1.4	The overview of the study	5
Chapter two Literature Review		
2.1	Anatomy	6
2.2	The pathology and ultrasonic appearance	12
2.2.1	Cryptorchidism	12
2.2.2	Varicocele	12
2.23	Epididymal cysts and spermatoceles	14
2.2.4	Simple testicular cyst with debris	15
2.2.5	Adenomatous lesion	16
2.2.6	Hydroceles	17
2.2.7	Testicular cancer	19
2.2.8	Orchitis	22
2.2.9	Intra testicular hematoma	23
2.2.10	Intratesticular abscess	24
2.3	physiology of scrotum	25
2.4	Ultrasound Image	26
2.5	Previous studies	27
Chapter Three Materials and Methods		
3.1	Design of the study	28
3.2	Population of the study	28
3.3	Sample size and types	28
3.4	Materials	28
3.5	Duration and place of the study	28
3.6	Method and data collection technique	28

The Contents		Page
3.7	Sonographic technique	29
3.8	Method of data analysis	29
3.9	Ethical approval	29
Chapter four Results		
4	Results	28
Chapter five Discussion, Conclusion and Recommendation		
5.1	Discussion	35
5.2	Conclusion	37
5.3	Recommendation	38
	References	39
	Appendices	41

List of Tables

NO	Table caption	Page
2.1	Shows the Grading of varicoceles disease.	13
2.2	Shows the classification of testicular tumors.	20
4.1	frequency distribution of age.	28
4.2	frequency distribution of weight	29
4.3	Frequency distribution of occupation	30
4.4	frequency distribution of marital status	31
4.5	frequency distribution of finding	32
4.6	cross tabulation age and final diagnosed	33
4.7	cross tabulation weight and final diagnosed	33
4.8	cross tabulation occupation and final diagnosed	34
4.9	cross tabulation marital status and final diagnosed	34

List of figures

NO	Title	Page
2-1	Normal intra scrotal anatomy	10
2-2	Normal intra scrotal anatomy	11
2-3	Normal intra scrotal anatomy	11
2.4	shows, the left inguinal testis	12
2.5	shows, the left scrotum shows a large extra testicular Varicocele	14
2.6	Shown above are 2D B-mode and color Doppler ultrasound images of multiple right Epididymal cysts in the head of the right epididymis.	15
2.7	shows the Cyst with debris	16
2.8	shows the extra testicular Adenomatoid lesion	17
2.9	shows, hydrocele is the pathological collection of fluid within the tunica vaginalis of the scrotum	19
2.10	shows the mixed germ cell tumor appears as focal lesion with heterogeneous reflectivity and cystic components (long arrow)	20
2.11	shows the embryonal cell	21
2.12	Shows the Prostatic metastasis.	22
2.13	Shows the Orchitis.	23
2.14	shows the testicular abscess	24
4.1	f requency distribution of age	28
4.2	frequency distribution of weight	29
4.3	frequency distribution of occupation	30
4.4	frequency distribution of marital status	31
4.5	frequency distribution of finding	32

List of Abbreviations

Abbreviation	meaning
AVM	Arteriovenous malformation
B-mode images	Image of brightness dots in ultrasound
CEUS	Contrast-Enhanced Ultrasound
CDUS	Color Doppler ultrasound
US	Ultrasonography
CAH	Congenital adrenal hyperplasia
HCG	Human chorionic gonadotropin
GCTs	Germ cell tumors
LDH	Lactic dehydrogenises
NSTT	Non-seminomatous testicular tumors
HIV	Human immune deficiency virus
TS	Testicular seminomas
TE	Tissue Elastography
MRI	Magnetic resonance image

Chapter One

Introduction

Chapter One

Introduction

1.1 Introduction

The testes have two main functions of spermatogenesis (an endocrine function), and male hormone (androgen) secretion as well as exocrine function. Both functions are dependent on a good blood supply and healthy tissues. Ischemia of only 1-3 hours, for example, results in decreased spermatogenesis and irreversible changes occur in only 6-8 hours, this makes twisting of the testicles due to trauma is a surgical emergency (Joseph et al, 2013).

Understanding the importance of male reproduction system abnormalities is also important; considering that testicular cancer is the most commonly occurring malignancy in men between the ages of fifteen and thirty-five. The incidence for mixed germ cell tumors alone is two to three cases per 100,000 males per year (in the United States).

Testicular cancer makes up about 1 percent of all cancers in men in the United States. About 8,000 new cases are discovered annually and approximately 390 men die of testicular cancer each year (Joseph et al, 2013). Testicular cancer most often occurs in white males between ages 20 and 39 and doubled in white males over the last decade (Daniel et al, 2013).

This disease is particularly hard on males emotionally because of the young age of its victims, and is the most common cancer in males between ages 15 and 35 (in the United States). Racially testicular cancer does not affect black people as exist in white ones and represents 5 times more in white with unknown reasons.

However in Saudi Arabia El-Senoussi et al, (2006) introduced study related to epidemiology and clinical characteristics of testicular tumors in Saudi during the period of January 1977 and June 1983, in which they showed that: among 62 patients with germinal testicular tumors the epidemiologic and clinical characteristics dependent on geographic distribution of population which analyzed as follows: Testicular seminomas (TS) and detect non-seminomatous testicular tumors comprised 50% each. The mean age was 41 and 27.8 years for TS and NSTT, respectively. Fifteen patients had cryptorchidism of the involved testicle. Three patients had a history of trauma to the involved testicle. (Joseph et al, 2013).

The most common presentations were painless testicular swelling (51.6%), painful swelling (16%), and abdominal or inguinal swelling (21%). The delay between the onset of symptoms and referral (mean 15 months) was considerable. Eighty percent of patients with NSTT and 45 % of those with TS had advanced disease at referral (Senoussi et al, 2006).The risk factors for testicular cancer include: Cryptorchidism (Uu-descended testicles in scrotum), prior testicular cancer, age, race, and some occupations. The risk of developing testicular cancer is increased by a factor of 10-20 with cryptorchism. About 10% of testicular cancers seem to have a genetic basis, so a father or sibling having testicular cancer should be an early warning to screen other males of the family. Klinefelter's Syndrome (A condition of a male having an extra X chromosome can be a cause of sterility), abnormal testicular development, and risk of developing germ cell tumors. Pesticide workers, leather workers, miners, and oil workers have slightly increased risk as well as the persons with human immunodeficiency virus (HIV) (Joseph et al, 2013). It is a vasectomy is a cause of testicular cancer in males. Males

have little knowledge of testicular self-exam, making this a poorly practiced screening tool at best. Many of these cancers present as painless masses so symptoms do not reach clinical significance early in the disease. Furthermore, many laypersons are not aware that ultrasound and blood markers can be used to disease and manage treatments.

Ultrasound is a sensitive and accurate technique for the evaluation of testicular abnormalities, and is widely accepted as the first-line imaging technique for many common and uncommon testicular diseases. Ultrasounds effectively the sole scrotal testicular lesions (Goddi et al, 2012).The hard"" lesions are more likely to be malignant, and the soft area suggests benignity. Imaging technique that a patient will undergo prior to surgery (Huang et al, 2012).

Traditionally, B mode (B-mode stands for brightness) ultrasound is extremely sensitive in the detection of testicular masses, however doesn't provide histological evidence to differentiate between benign and malignant tissues which has been a challenging for ultrasound unit facility; although some ultrasound techniques such as Color Doppler ultrasound(CDUS, defined as: color Doppler ultrasound), Contrast-Enhanced Ultrasound (CEUS) and Tissue Elastography (TE, defined as: is an ultrasound measure of the stiffness of tissue.) are available to provide a more detailed interrogation of focal testicular lesions. Color Doppler ultrasound is an important ultrasound technique for the evaluation of a focal in determinate testicular lesion (Horstman et al, 1992). With rare exception, any solid intra-testicular lesion with an increase in color Doppler flow should be considered suspicious for malignancy. However, this is not without limitations, as small testicular tumors may appear a-vascular on the CDUS examination. The use of CEUS improves characterization of testicular lesions, with more detailed

evaluation of intra-testicular vascular flow (Lock et al, 2011). More importantly, CEUS allows conclusive demonstration of lack of vascularity that is likely to be encountered in benign lesions (Hedayatietal, 2012).

Demonstration of an avascular abnormality, which is likely to be benign in nature and may resolve, would allow the option of watchful waiting with ultrasound, without subjecting the patient to unnecessary surgery (Shah et al, 200).

Tissue elastography is an ultrasound measure of the stiffness of tissue. Given that most solid focal tumors differ in their consistency from the surrounding tissue, TE is a further technique that allows better differentiation between benign and malignant thesis outlines. Chapter two will shows literature review (section one) and previous studies in section two. Chapter three will deal with methodology. Chapter four will highlight the results and discussion. Chapter five will show the conclusion and recommendation.

1.2 Problem of the study:

Swelling of Scrotal has many Negative Effects including the great psychological factor of the patient, which leads in the future to the occurrence of many problems, including infertility and sever pain and finally can lead to death if not treated.so we need to determine the causing this swelling.

1.3 Objectives of the study:

1.3.1 General objectives:

To evaluate scrotal pathology causes .

1.3.2 Specific objectives:

Access of the role of gray scale ultrasound in accurately distinguish between testicular and extra testicular masses

Access of role of gray scale ultrasound in evaluation of scrotal pathologies

1.4 Thesis outline:

The following study will be laid out in five chapters. Chapter one deals the introduction, problem of the study, objectives and thesis outlines. Chapter two was literature review (section one) and previous studies in section two. Chapter three was methodology. Chapter four was highlighting the results and discussion. Chapter five was show the conclusion and recommendation.

Chapter Two

Literature Reviews and Previous Study

Chapter Two

Literature Reviews and Previous Study

2.1 Anatomy

The adult testes are ovoid glands measuring 3 to 5 cm in length, 2 to 4 cm in width, and 3 cm in antero posterior dimension. Each testis weighs 12.5 to 19 g. Testicular size and weight decrease with age.

The testes are surrounded by a dense white fibrous capsule, the tunica albuginea. Multiple thin septations (septula) arise from the innermost aspect of the tunica albuginea and converge posteriorly to form the mediastinum testis.(Rose.2001)

The mediastinum testis forms the support for the entering and exiting testicular vessels and ducts. As the septula proceed posteriorly from the tunica albuginea, they form 250 to 400 wedge-shaped lobule that contain the seminiferous tubules. .(Rose.2001)

There are approximately 840 tubules per testis. As the tubules course centrally, they join other seminiferous tubules to form 20 to 30 larger ducts, known as the tubule recti. The tubule recti enter the mediastinum testis, forming a network of channel within the testicular stroma, called the rete testis. There terminate in 10 to 15 efferent ductules at the superior portion of the mediastinum, which carry the seminal fluid from the testis to the epididymis. .(Rose.2001)

The normal testis has a homogeneous echo texture composed of uniformly distributed medium level echoes, similar to that of the thyroid. The septula testis may be seen as linear echogenic or hypo echoic

structures. The mediastinum testis is sometimes seen as a linear echogenic band extending cranio caudally within the testis (Carol 2011).

Its appearance varies according to the amount of fibrous and fatty tissue present. It is best visualized between the ages of 15 and 60 years.

The epididymis is a curved structure measuring 6 to 7 cm in length and lying postero lateral to the testis. It is composed of a head, a body, and a tail. The head of the epididymis, also known as the Globus major, is located adjacent to the superior pole of the testis and is the largest portion of the epididymis. It is formed by 10 to 15 efferent ductules from the rete testis joining together to form a single convoluted duct, the ductus epididymis. .(Rose.2001)

This duct forms the body and the majority of the tail of the epididymis. It measures approximately 600 cm in length and follows a convoluted course from the head to the tail of the epididymis.

The body or corpus of the epididymis lies adjacent to the postero lateral margin of the testis. .(Rose.2001)

The tail or Globus minor is loosely attached to the lower pole of the testis by areolar tissue. .(Rose.2001)

The ductus epididymis forms an acute angle at the inferior aspect of the Globus minor and courses cephalic on the medial aspect of the epididymis to the spermatic cord. .(Rose.2001)

Sonographically, the epididymis is normally iso echogenic or slightly more echogenic than the testis, and its echo texture may be coarser.

The Globus major normally measures 10 to 12 mm in diameter and lies lateral to the superior pole of the testis. .(Rose.2001)

The body tends to be iso echoic or slightly less echogenic than the Globus major and testis. The normal body measures less than4 mm in diameter, averaging 1 to 2 mm. The appendix testis, a remnant of the upper end of the Para mesonephric (müllerian) duct, is a small ovoid structure usually located on the superior pole of the testis or in the groove between the testis and the head of the epididymis. The appendix testis is identified sonographically in 80% of testes and is more readily visible when a hydrocele is present. The appendix testis may appear stalk-like and pedunculated, cystic, or even calcified (Carol 2011).

The appendices of the head and tail of the epididymis are blind-ending tubules (vasa a berrantia) derived from the mesonephric (wolffian) duct; they form small stalks, which may be duplicated, and project from the epididymis. Rarely, other appendages, the paradidymis (organ of Giraldés) and the superior and inferior vas a berrans of Haller, may be seen. The appendages of the epididymis are most often identified sonographically as separate structures when a hydrocele is present. Knowledge of the arterial supply of the testis is important for interpretation of color flow Doppler sonography of the testis. (Carol 2011).

Testicular blood flow is supplied primarily by the deferential, cremasteric (external spermatic), and testicular arteries. The deferential artery originates from the inferior vesicle artery and courses to the tail of the epididymis, where it divides and forms a capillary network. .(Rose.2001)

The cremasteric artery arises from the inferior epigastria artery. It courses with the remainder of the structures of the spermatic cord through the inguinal ring, continuing to the surface of the tunica vaginalis, where it anastomoses with capillaries of the testicular and deferential arteries. .(Rose.2001)

The testicular arteries arise from the anterior aspect of the aorta immediately below the origin of the renal arteries. They course through the inguinal canal with the spermatic cord to the postero superior aspect of the testis. .(Rose.2001)

The deferential and cremasteric arteries within the spermatic cord primarily supply the epididymis and extra testicular tissues, but they also supply the testis through anastomoses with the testicular artery (Carol 2011).

The spermatic cord consists of the vas deferens; the cremasteric, deferential, and testicular arteries; a pampiniform plexus of veins; the lymphatics; and the nerves of the testis. .(Rose.2001)

Sonographically, the normal spermatic cordlies just beneath the skin and is difficult to distinguish from the adjacent soft tissues of the inguinal canal. It may be visualized within the scrotum when a hydroceles present or with the use of color flow Doppler sonography. (Carol 2011).

The dartos, a layer of muscle fibers lying beneath the scrotal skin, is continuous with the scrotal septum, which divides the scrotum into two chambers. The walls of the chambers are formed by the fusion of the three facial layers. The tunica vaginalis is the space between these scrotal facial layers and the tunica albuginea of the testis (Carol 2011).

During embryologic development, the tunica vaginal is arises from the processes vaginalis, an out pouching of fetal peritoneum that accompanies the test is in its descent into the scrotum. The upper portion of the processes vaginalis, extending from the internal inguinal ring to the upper pole of the testis, is normally obliterated. .(Rose.2001)

The lower portion, the tunica vaginalis, remains as a closed pouch folded around the testis. Only the posterior aspect of the testis, the site of attachment of the testis and epididymis, is not in continuity with the tunica vaginalis .The inner or visceral layer of the tunica vaginalis covers the testis, epididymis, and lower portion of the spermatid cord. The outer or parietal layer of the tunica vaginalis.(Rose.2001)

lines the walls of the scrotal pouch and is attached to the facial coverings of the testis. A small amount of fluid is normally present between these two layers, especially in the Polar Regions and between the testicle and epididymis. .(Rose.2001)

The scrotal covering layers are normally indistinguishable by sonography and are visualized as a single echogenic stripe. If any type of fluid is present in the scrotal wall, the tunica vaginalis may be identified as a separa restructure (Carol 2011).

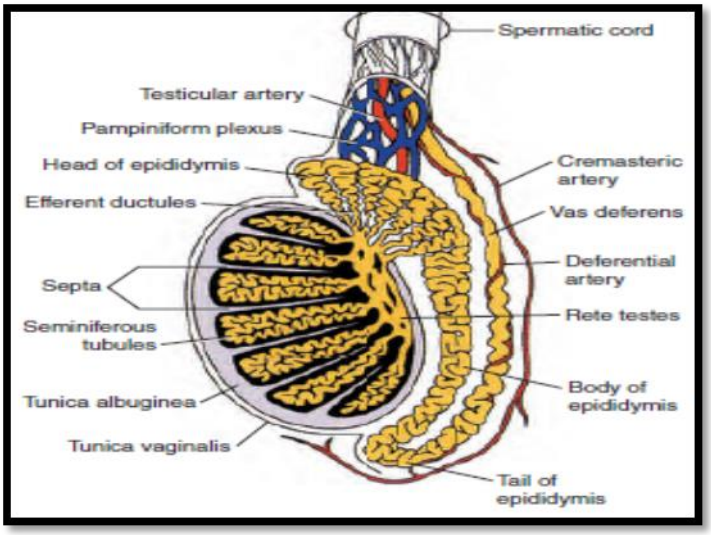

Figure 2-1: Normal intra scrotal anatomy **(Carol 2011).**

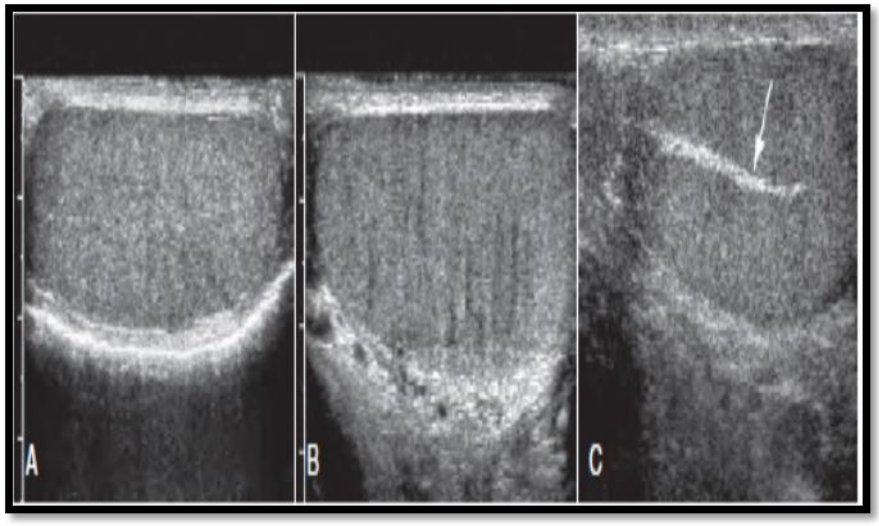

Figure 2-2: Normal intra scrotal anatomy. Longitudinal scans show A, normal homogeneous echo texture of the testis; B, striated appearance of the septula testis; C, mediastinum testis (arrow) as a linear echogenic band of fibro fatty tissue (Carol 2011).

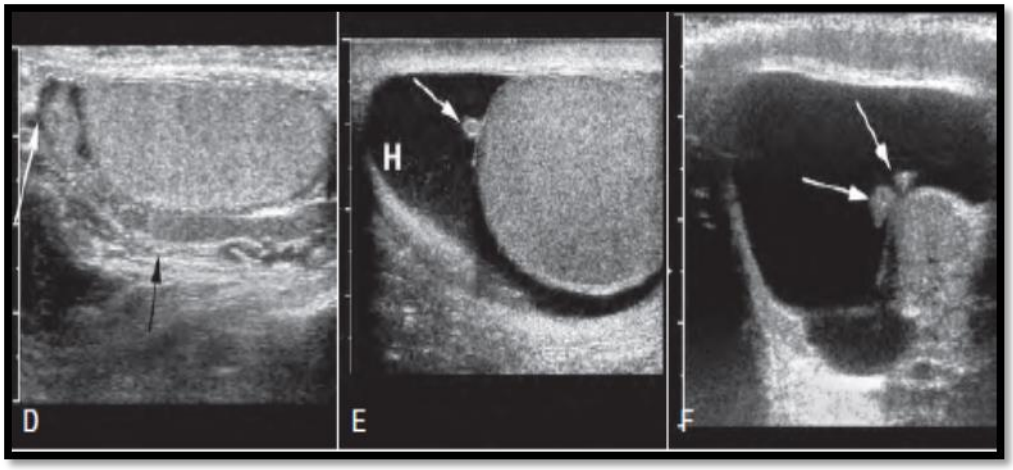

Figure 2-3: D, head (white arrow) and body (black arrow) of epididymis; E, hydrocele (H) and appendix testis (arrow); and F, appendages of epididymis (arrows) (Carol 2011).

2.2 The pathology and ultrasonic appearance

2.2.1 Cryptorchidism

Cryptorchidism is failure of descent of the testes into the scrotum during fetal development. The defect may result in the testes being located within the abdomen, inguinal canal, or some ectopic location. Both unilateral and bilateral cryptorchidism are associated with impaired spermatogenesis and an increased risk of testicular tumors; testes that remain in an intra-abdominal location are believed to have a 40-fold increased risk of developing testicular carcinoma (making the risk 1 per 1000 to 2500) (Pillai and Besner, 1998).

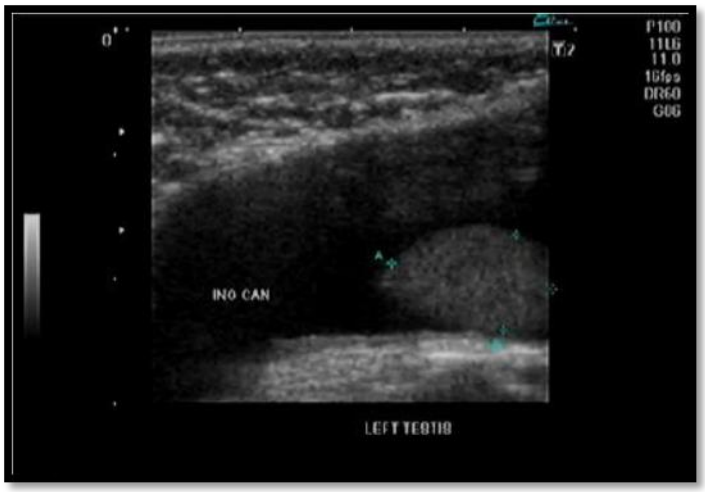

Figure (2.4) shows, the left inguinal testis (see ultrasound images of left inguinal testis below). (Pillai and Besner, 1998).

2.2.2 Varicocele

A Varicocele is caused by dilatation of the pampiniform plexus of spermatic veins as shown in. It is present in 15 to 20 percent of post-pubertal males, occurring in the left hemi scrotum in the vast majority of cases.

The reason for the left-sided predominance may be explained anatomically. The left spermatic (gonadal) vein is one of the longest veins in the body, entering the left renal vein at a perpendicular angle.

The intravascular pressure in the left renal vein is higher than on the right because it is compressed between the aorta and the superior mesenteric artery coming off the aorta above the renal vein, thereby producing a "nutcracker effect." This phenomenon causes increased pressure in the left gonadal vein, which can dilate and cause incompetence of the valve leaflets, leading to retrograde flow of blood toward the testis in the erect position (Henry et al, 2009).

The Varicocele are graded as I, II, or III, according to size as shown in table (2.1) ((Pillai and Besner, 1998).

Table (2.1) shows the Grading of Varicocele disease (Pillai and Besner, 1998).

`Grade	Size	Clinical description
I	Small	Palpable only with valsalva maneuver
II	Moderate	Nonvisible on inspection, but palpable upon standing
III	Large	Visible on gross inspection

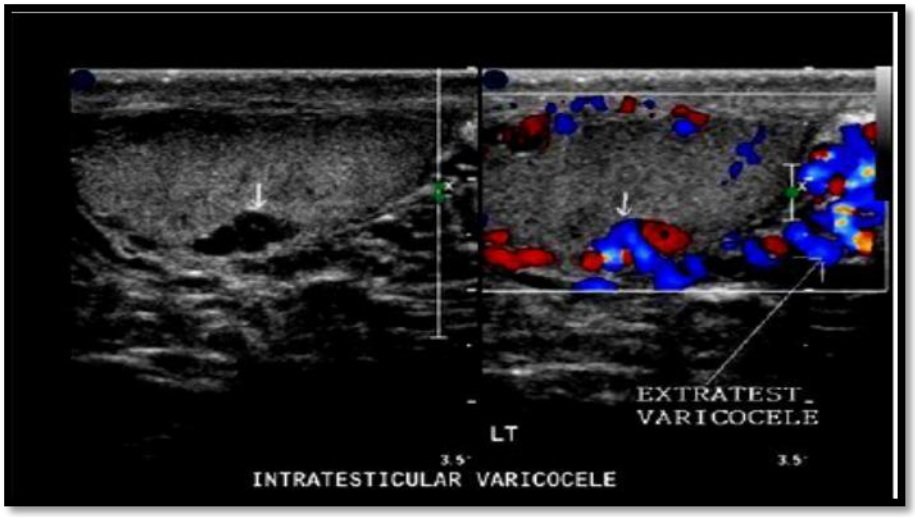

Figure (2.5) shows, the left scrotum shows a large extra testicular Varicocele (long arrow in image on left). Also present are a few dilated vessels (more than 2 mm. each) in the sub capsular part of the left testes (small arrow in color Doppler image). (Henry et al, 2009).

2.2.3 Epididymal cysts and spermatoceles

Epididymal cysts are commonly palpated in the head (caput) of the epididymis and are generally asymptomatic. They occur with increased frequency in male offspring of mothers who used diethylstilbestrol during pregnancy. In addition, Epididymal cyst adenomas are seen in more than one-half of patients with Von Hippel-Lindau disease and are often bilateral (Choyke et al, 1997). The cystic scrotal mass appears as a fluid accumulation between the parietal and visceral layers of the tunica vaginalis

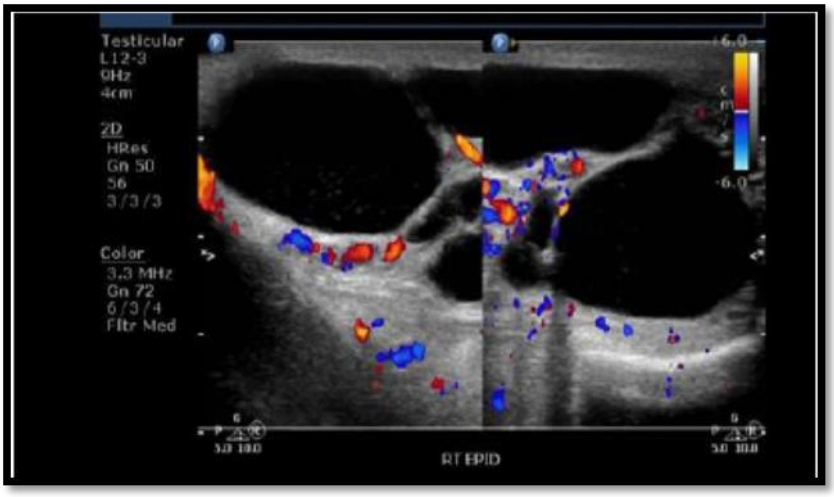

Figure (2.6) -Shown above are 2D B-mode and color Doppler ultrasound images of multiple right Epididymal cysts in the head of the right epididymis. Surprisingly the septae show remarkable vascularity (Choyke et al, 1997).

2.2.4 Simple testicular cyst with debris

Simple cysts are detected incidentally and usually occur in men over 40 years of age, with a size range from 2mm to 2cm in diameter. The cysts are usually solitary, and may be associated with spermatoceles. On B-mode ultrasound, a simple cyst would appear an anechoic center surrounded by a thin wall, with a degree of posterior acoustic enhancement (Dogra et al, 2001).

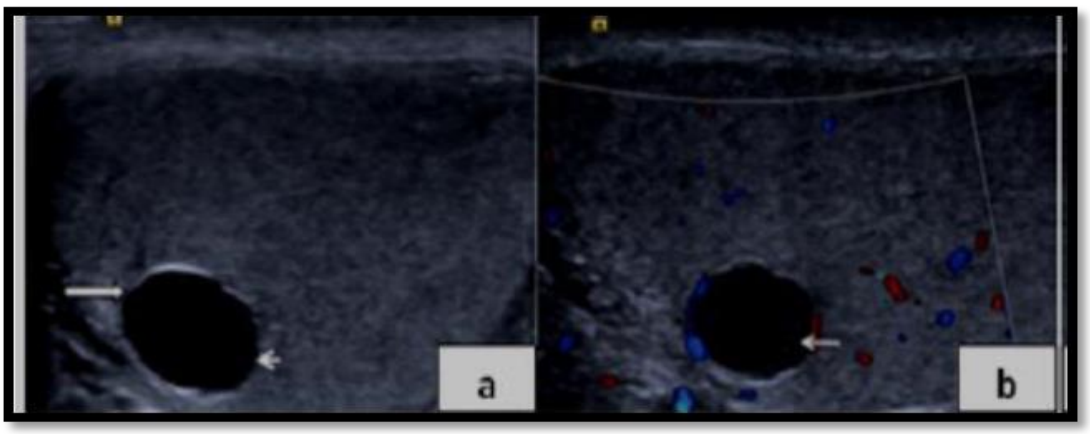

Figure (2.7) shows the Cyst with debris. (a) A 6-mm anechoic lesion (long arrow) is noted in the testicle with a thin clear demonstrated. A‘‘fluid-debris’’ level is noted (short arrow). (b) No internal color Doppler signal is demonstrated within the debris present in the lower aspect of the cyst (arrow) (Dogra et al, 2001).

2.2.5 Adenomatoid lesion

Extra testicular lesions, although almost always benign, may cause a diagnostic challenge clinically and significant patient anxiety.

An a denomatoid tumor is the second most common extra testicular tumor (cysts are the most common), followed by a lipoma. The ultrasound appearances of an Adenomatoid tumor consist of a hyperechoic rounded tumor most commonly at the Epididymal tail. Following CEUS the focal Epididymal lesion demonstrates enhancement and early washout of micro bubble contrast (Dogra et al, 2001).

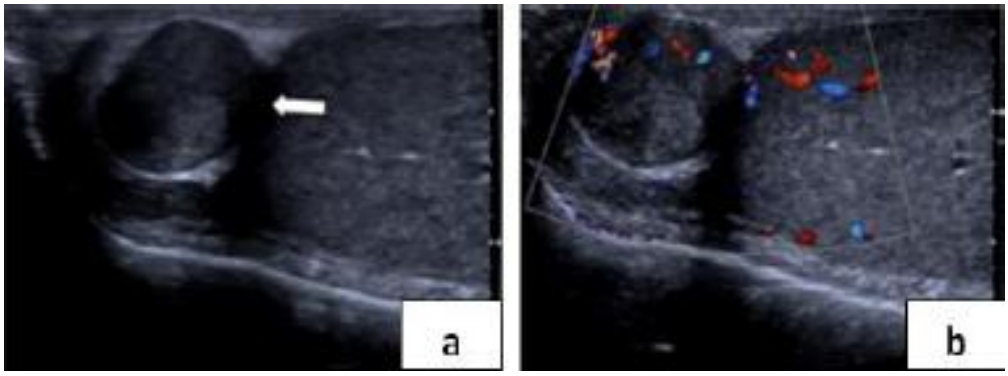

Figure (2.8) shows the extra testicular adenomatoid lesion. (a) A heterogeneous lesion (arrow) measuring 12mm is noted within the right epididymal head. (b) Color Doppler signal is demonstrated within the lesion **(Dogra et al, 2001).**

2.2.6 Hydroceles

A hydrocele is a collection of peritoneal fluid between the parietal and visceral layers of the tunica vaginalis (the investing layer that directly surrounds the testis and spermatic cord) which shown in (Figure2.9&10).

It is the same layer that forms the peritoneal lining of the abdomen. Hydroceles are believed to arise from an imbalance of secretion and reabsorption of fluid from the tunica virginals (Choyke et al, 1997).

The hydrocele depicted above is non-communicating (there is no connection between the hydrocele and the peritoneum; the fluid comes from the mesothelium lining of the tunica vaginalis).Hydroceles range in size from small, soft collections that still allow palpation of the scrotal contents to massive, tense collections of several liters that make examination impossible. Symptoms of pain and disability generally increase with the size of the mass. **(Dogra et al, 2001).**

The fluid of hydrocele in the scrotal sac usually illuminates well which differentiates the process from a possible hematocele, hernia, or solid

mass. A scrotal ultrasound should be considered if the diagnosis is in question since a reactive hydrocele can occur in the presence of a testicular neoplasm or with acute inflammatory scrotal conditions. Idiopathic hydroceles usually arise over a long period of time and are most common. Inflammatory conditions of the scrotal contents (epididymitis, torsion, appendicular torsion) can produce an acute reactive hydrocele, which often resolves with treatment of the underlying condition. Idiopathic hydroceles are often asymptomatic, despite considerable scrotal enlargement. Thus, treatment is necessary only for symptomatic complaints or for the rare situation of compromised scrotal skin integrity from chronic irritation, pressure, etc. (Choyke et al, 1997).

The most common treatment is surgical excision of the hydrocele sac or a simple aspiration is generally unsuccessful due to rapid re-accumulation of fluid. On the other hand, percutaneous aspiration of the hydrocele fluid may be successful if combined with instillation of a sclerosing agent into the sac. (Choyke et al, 1997).

The potential risks of the latter approach are a low incidence of reactive Orchitis /epididymitis and a higher rate of recurrence, which may then make open surgery more difficult because of the development of inflammatory adhesions between the hydrocele sac and the scrotal contents. Hydroceles discovered in infancy are usually "communicating," since they are associated with a patent processus vaginalis, which allows flow of peritoneal fluid into the scrotal sac. They usually disappear in the recumbent position and are often associated with herniation of abdominal contents (indirect hernia) through the process us vaginalis. Surgical repair is advised in these cases (Choyke et al, 1997).

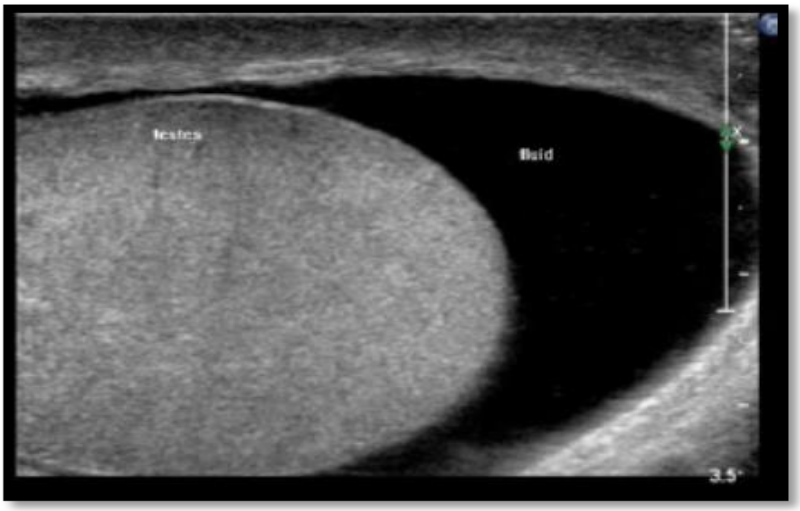

Figure (2.9) -shows, hydrocele is the pathological collection of fluid within the tunica vaginalis of the scrotum (Choyke et al, 1997).

2.2.7 Testicular cancer

Testicular cancer is the most common solid malignancy affecting males between the ages of 15 and 35, although it accounts for about 1 percent of all cancers in men. Germ cell tumors (GCTs) account for 95 percent of testicular cancers table (2.2). (Choyke et al, 1997).

They may consist of one predominant histologic pattern, or represent a mix of multiple histologic types. For treatment purposes, two broad categories of testis tumors are recognized: pure seminoma (no non seminomatous elements present), and all others, which together are termed non seminomatous germ cell tumors (NSGCTs).

In most series, the ratio of seminoma to NSGCT is about one. Testicular cancer has become one of the most curable of solid neoplasms because of remarkable treatment advances beginning in the late 1970s. Prior to that time, testicular cancer accounted for 11 percent of all cancer deaths in men between the ages of 25 to 34, and the five-year survival rate was 64 percent. In 2011, about 350 deaths from testicular cancer are expected in the United States. The five-year survival rate is over 95 percent (Ercan et al, 2007).

Table (2.2) shows the classification of testicular tumors (Who-Lyon , 2004).

Germ cell tumors
Seminoma
Seminoma with syncytiotrophoblastic cells
Spermatocytic seminoma
Spermatocytic seminoma with sarcoma
Nonseminomatous germ cell tumors
Embryonal carcinoma
Teratoma
Dermoid cyst
Monodermal teratoma
Teratoma with somatic type malignancy
Trophoblastic tumors (choriocarcinoma)
Yolk sac tumor (endodermal sinus tumor)
Mixed germ cell tumors
Sex cord-stromal tumors
Sertoli cell tumor
Leydig cell tumor
Granulosa cell tumor
Mixed types (eg, Sertoli-Leydig cell tumor)

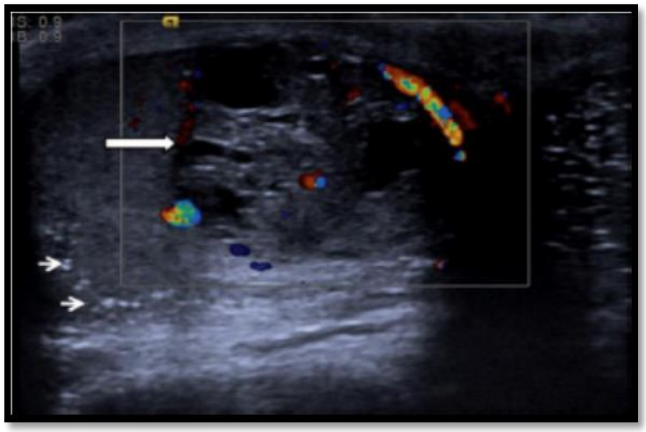

Figure (2.10) shows the mixed germ cell tumor appears as focal lesion with heterogeneous reflectivity and cystic components (long arrow). Color Doppler demonstrates distortion of the normal vascular pattern by the lesion. Note is also made of background testicular microlithiasis (short arrows)(Ercan et al, 2007).

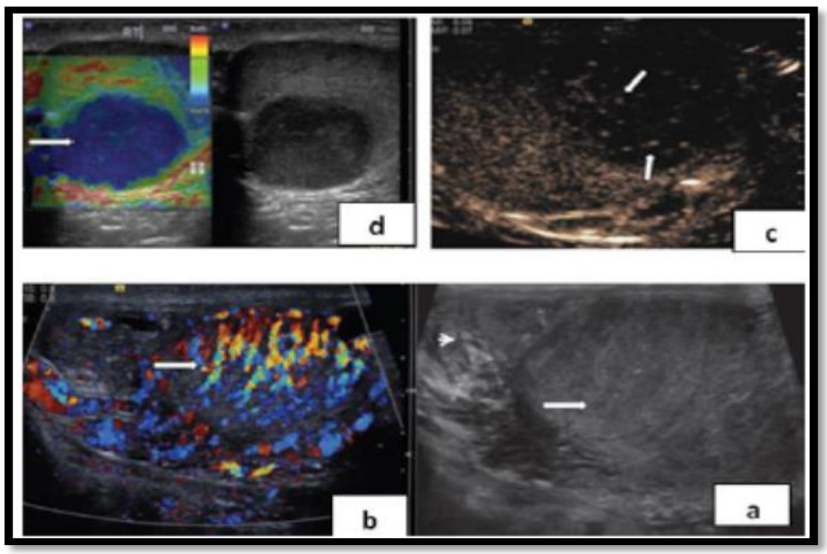

Figure (2.11), shows the embryonic cell tumor (a) B-Mode ultrasound demonstrates a focal lesion with a slightly heterogeneous reflectivity (arrow). (b)Color Doppler ultrasound demonstrates loss of normal parenchymal vascular pattern, replaced by an abnormal vascularity (the ‘‘crisscross’’vascular pattern; arrow). Color Doppler flow is demonstrated in the large vessels only. (c) Tissue elastography demonstrates a‘ ‘blue’’ lesion, therefore clearly a ‘‘hard’’ lesion (arrow) (d) in contrast-enhanced ultrasound, particulate movement of contrast (arrows) are seen throughout the lesion in a haphazard pattern, confirming the vascularity is present within all components of the lesion(Ercan et al, 2007).

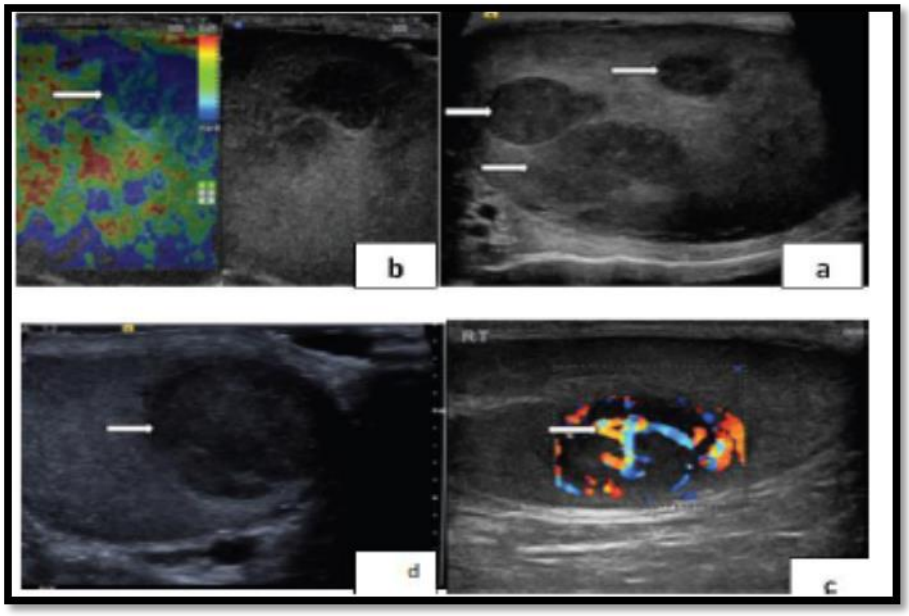

Figure (2.12) shows the Prostatic metastasis. (a) B-mode ultrasound demonstrates multifocal hypoechoeic lesions (arrows). (b) Color Doppler ultrasound demonstrates internal vascularity within the lesions (arrows). (c) The lesions appear ‘‘hard’’ on elastography (blue area arrow). (d) Enhancement is noted within the lesion, confirming internal vascularity and peripheral contrast enhancement (arrow) wall (Ercan et al, 2007).

2.2.8 Orchitis

Primary Orchitis (Figure 2.14) is rare without associated epididymo-orchitis, but may be caused by human immunodeficiency virus or mumps virus. The process may be seen as diffuse or focal.

Orchitis may manifest as multiple hypo-echoic abnormalities within the testicular parenchyma, with septal accentuation with foci of low reflectivity conforming to the lobular anatomy (Cook and Dewbury, 2000).

As the condition progresses, areas of venous infarction occur with associate hemorrhage, giving rise to areas of mixed or increased reflectivity. Increased blood flow to the epididymis and testis at CDUS

and CEUS examination is a well-established criterion for the diagnosis of epididymo-orchitis.

After treatment and healing, changes may resolve completely, or often there is loss of volume of the testis with fibrosis giving a heterogeneous pattern on ultrasound. The great variability in ultrasound appearances can cause diagnostic confusion, but awareness of the changes and progression may allow a more confident diagnosis to be made in the appropriate clinical setting (Cook and Dewbury, 2000)

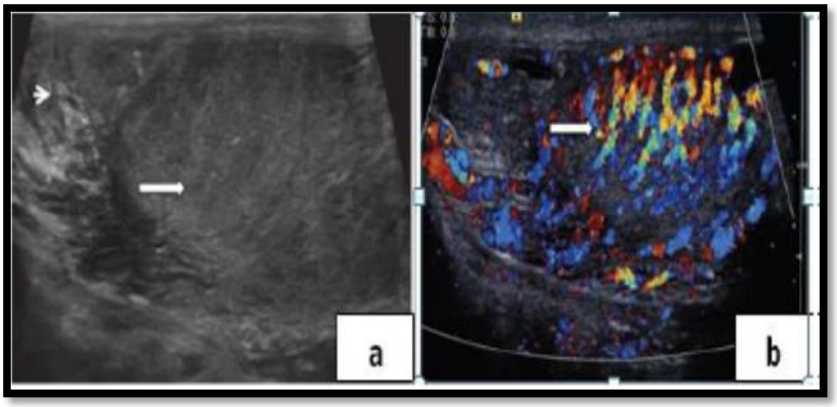

Figure (2.13), shows the Orchitis. (a) Longitudinal ultrasound of the testis demonstrates patchy heterogeneous reflectivity within the testis (long arrow) and enlargement of the epididymis (short arrow). (b) There is marked increase in vascularity within the testis on color Doppler ultrasound (arrow)(Cook and Dewbury, 2000).

2.2.9 Intra- testicular hematoma

A history of trauma should raise the suspicion of the differential of an Intratesticular hematoma. Acutely; the hematoma appears as patchy increased reflectivity.

On follow-up it may appear as an area of low reflectivity, with size reduction as the hematoma retracts. The most important differential diagnosis is malignancy, and therefore an accurate history, lack of

vascularity on both CDUS and CEUS, absence of tumor markers, and reduction in the size of the abnormality on sequential scans is indicative of a benign entity (Purushothaman et al, 2007).

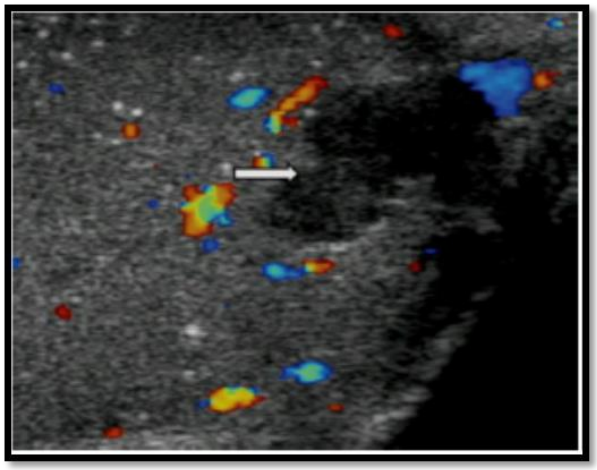

Figure (2.14) shows the Intra testicular hematoma. A well-circumscribed (arrow) focal area of low reflectivity with internal echoes is noted in the testis of a patient involved in a motorcycle accident. The lesion demonstrates low reflectivity. Color Doppler ultrasound confirms absence of vascularity, in keeping with the diagnosis of traumatic intra testicular hematoma. At 4 weeks there was reduction in size of the lesion. Incidental microlithiasis is present (Purushothaman et al, 2007).

2.2.10 Intratesticular abscess

Intra testicular abscesses are unusual and are associated with severe epididymo-orchitis. It may also arise secondary to mumps, trauma or infarction. The ultrasound appearances are of a lesion of low reflectivity with irregular borders. Hyper-vascular rims may be visible surrounding a testicular abscess on CEUS and CDUS but no internal vascularity is present. The abnormality observed in testicular abscess does not conform to lobular distribution which may help to differentiate this from a segmental infarction (Stewart and Sidhu 2007).

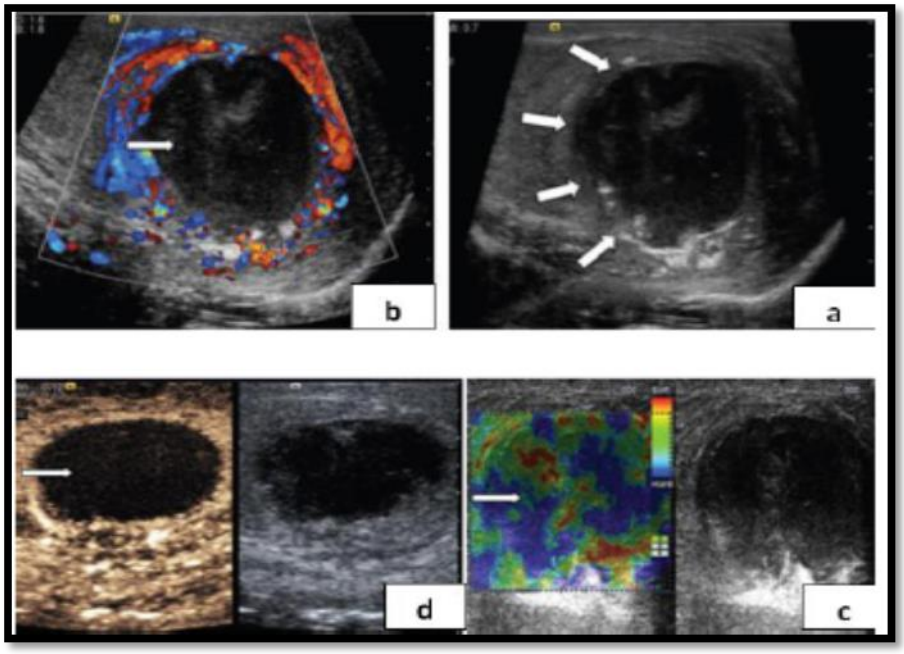

Figure (2.15) shows the testicular abscess (a) On B-mode ultrasound a focal lesion with low internal echoes (arrows) is seen in a patient with history of resolving epididymo-orchitis. (b) On color Doppler ultrasound there is increased vascularity at the periphery of the lesion but none within the lesion (arrow). (c) Contrast-enhanced ultrasound image demonstrating increased absence of vascularity in the abscess (arrow) with some rim enhancement. (d) Tissue elastography demonstrates a heterogeneous pattern of firmness but no focal ‘‘hard’’ lesion is demonstrated (arrow) (Stewart and Sidhu 2007).

2.3 physiology of scrotum

The function of the scrotum is to protect the testes and to keep them at a temperature several degrees below the normal body temperature. The scrotum thus protrudes from the body wall: moreover, it contracts from cold, exercise, or sexual stimulation and expands and relaxes when warm. When contracted, it conserves heat; while relaxed it is smooth and elongated, permitting the circulation of air that effects cooling. The relatively cool temperature of the scrotum is thought to be important for the production of viable sperm.

The muscle tone of the scrotum becomes weakened and relaxed in older men. In animals whose scrotum is always tight against the body, as in rats, boars, and stallions, the testes are cooled by the intricate blood system that surrounds them. Failure of the scrotum to cool the testes, which occurs during high fevers or, in some animals, during the hot summer months, causes temporary sterility.

2.4 Ultrasound Image :

2.4.1 Ultrasound physics

Ultrasound is the name given to high-frequency sound waves, over 20000 cycles per second (20 kHz). These waves, inaudible to humans, can be transmitted in beams and are used to scan the tissues of the body. Ultrasound pulses of the type produced by the scanners described here are of a frequency from 2 to 10 MHz (1 MHz is 1 000 000 cyclesper second). The duration of the pulse is about 1 microsecond (a millionth of a second) and the pulses are repeated about 1000 times per second. Different tissues alter the waves in different ways: some reflect directly while others scatter the waves before they return to the transducer as echoes.

The wave pass through the tissues at different speeds .The frequency of ultrasound is many times greater than that of audible sound. The reflected ultrasound pulses detected by the transducer need to be amplified in the scanner. (P.E.S palmer, 1995).

The echoes that come from deep within the body are more attenuated than those from the more superficial parts, and therefore require more amplification. Ultrasound scanners have controls that can alter the overall sensitivity, the "threshold", of the instrument, as well as change the amplification of the echoes from different depths. When working with any scanner it is necessary to achieve balanced image, one that contains echoes of approximately equal strengths from all depths of tissue .when the echoes return to the transducer, it is possible to reconstruct a two-dimensional map of all the tissues that have been in the beams. The

information is stored in a computer and displayed on a video (television) monitor. Strong echoes are said to be of "high intensity" and appear as brighter dots on the screen. Monitor this manual refers only to ultrasound used for medical diagnosis, and not to ultrasound used for other purposes: these require quite different equipment (P.E.S palmer, 1995).

2.4 .2 Scrotal ultrasound technique

No preparation is required. The patient position should be supine. Lift the penis upwards towards the abdomen and cover with a towel. Apply coupling agent liberally to cover the scrotum. Transducer choice If available, a 7.5 MHz sector transducer is preferable, especially for children. Otherwise, use a 5 MHz transducer. The scanning technique is Scan both testes from different angles. Compare the testes at each Projection (P.E.S palmer, 1995)

2.5 Previous studies:

In the realm of previous studies related to characterization of testicular swelling by ultrasound.

Previous study by zaid hadi kadhim,etal 2016 have sonographic findings in patients with scrotal swelling , the aims of the study were to establish the causes of scrotal swelling in the population and to evaluate the relationship between clinical , demographical and sonographic findings 100 patients with age range between 1-77 years presented with scrotal swellings were examined by high resolution real time ultrasound using 5-12 MHZ linear probe during the period from October 2011 to April 2012 in al diwaniya teaching hospital.

Among of the scrotal swelling, hydrocele was the commonest finding 33% and Varicocele 20%, Epididymal cyst 14%, inflammation 11% trauma 6.7%, testicular torsion 2.6%, trauma 6.7% and scrotal hernia 20.6%.

Chapter Three

Materials and Methods

Chapter Three

Materials and Methods

3.1 Design of the study:

This study is across sectional descriptive study was collected from population were complaining of scrotal sac swelling

3.2 Population of the study:

The medical records and ultrasound images of 34 male patients with testicular pathology were reviewed. The patients were aged from newborn to 80 years (mean age, 40 years).

3.3 Sample size and types:

Ultrasound images of 34 male patients with testicular pathology were reviewed.

3.4 Materials

Machine used (Philips Medical Systems, Bothell, WA) and (Toshiba Medical Solutions, model :RUS 6000D).with 7 MHZ linar transducer using coupling gel with Sony printer with thermal paper

3.5 Duration and place of the study:

The patient was collected in Omdurman military hospital between 2018 and 2019.

3.6 Method and data collection technique:

Using a special data collection sheet (questionnaire),sample of 34 male patient with scrotal sac swelling. the penis upwards towards the abdomen and cover with a towel.

3.7 Sonographic technique:-

No preparation is required. The patient position should be supine. Lift Apply coupling agent liberally to cover the scrotum. Transducer choice If available, a 7.5 MHz sector transducer is preferable, especially for children. Otherwise, use a 5 MHz transducer. The scanning technique is Scan both testes from different angles. Compare the testes at each Projection Additional technique –Valsalva or upright positioning. (P.E.S palmer, 1995)

3.8 Method of data analysis:

For analysis, result and discussion, we have used Microsoft excel.

3.9 Ethical approval:-

The ethical approval was granted from the hospital and the radiology And ultrasound department, which include commitment of no disclose of any information concerning the patient identification.

Chapter Four

Results

Chapter four

Results

Table (4.1) frequency distribution of age.

	Frequency	Percent	Valid Percent	Cumulative Percent
1-15 years	3	8.8	8.8	8.8
16-30 years	10	29.4	29.4	38.2
31-45 years	9	26.5	26.5	64.7
46-60 years	4	11.8	11.8	76.5
61-75 years	6	17.6	17.6	94.1
more than 75 years	2	5.9	5.9	100.0
Total	34	100.0	100.0	
Minimum =1 , maximum =80, means=39.53, std= 21.55				

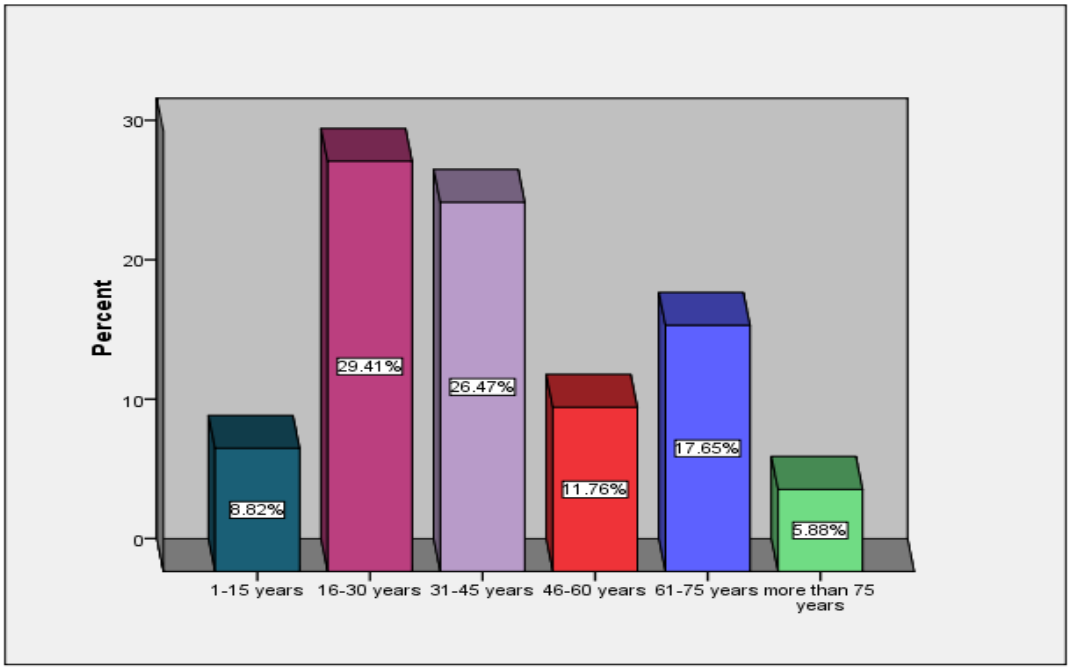

Figure (4.1) frequency distribution of age

Table (4.2) frequency distribution of weight

	Frequency	Percent	Valid Percent	Cumulative Percent
12-32 kg	3	8.8	8.8	8.8
54-74 kg	22	64.7	64.7	73.5
75 -86 kg	9	26.5	26.5	100.0
Total	34	100.0	100.0	
Minimum= 12,maximum=86,mean=65.41, std=16.99				

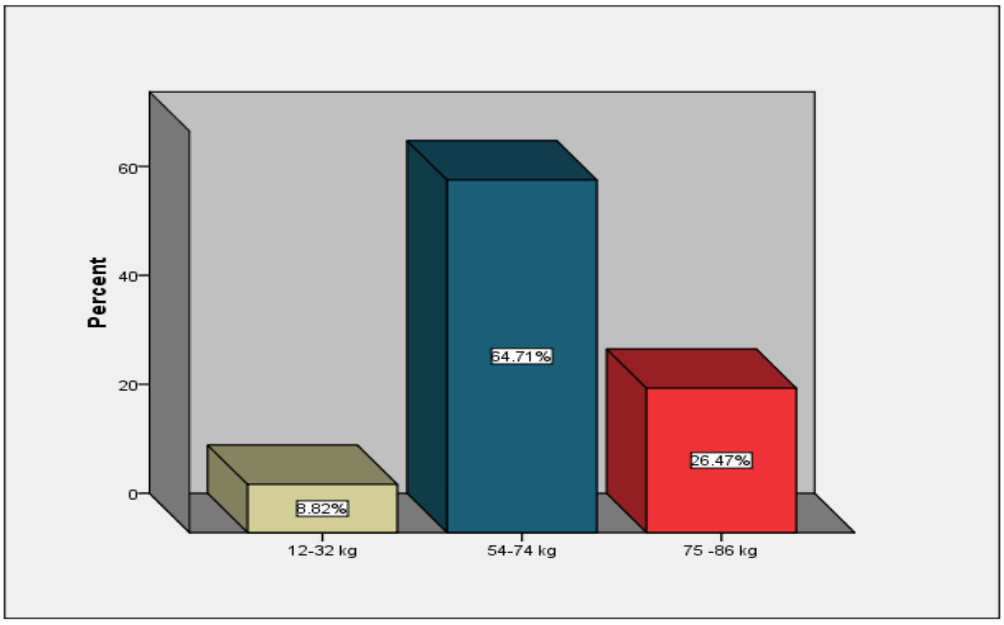

Figure (4.2) frequency distribution of weight

Table (4.3) frequency distribution of occupation

	Frequency	Percent	Valid Percent	Cumulative Percent
child	1	2.9	2.9	2.9
dealer	6	17.6	17.6	20.6
military student	4	11.8	11.8	32.4
officer	12	35.3	35.3	67.6
ranker	7	20.6	20.6	88.2
student	4	11.8	11.8	100.0
Total	34	100.0	100.0	

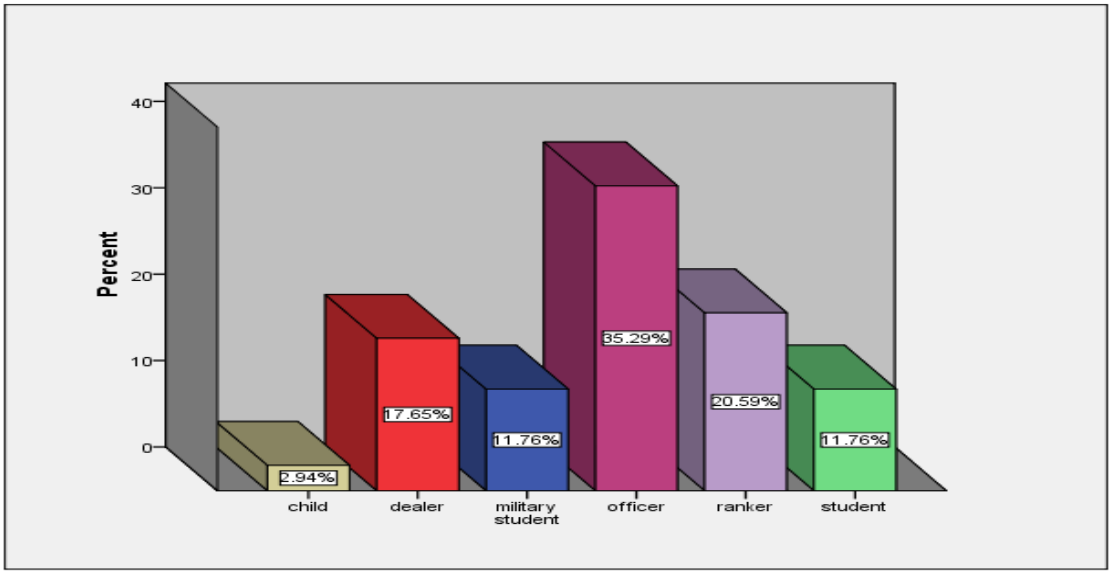

Figure (4.3) frequency distribution of occupation

Table (4.4) frequency distribution of marital status

	Frequency	Percent	Valid Percent	Cumulative Percent
married	20	58.8	58.8	58.8
unmarried	14	41.2	41.2	100.0
Total	34	100.0	100.0	

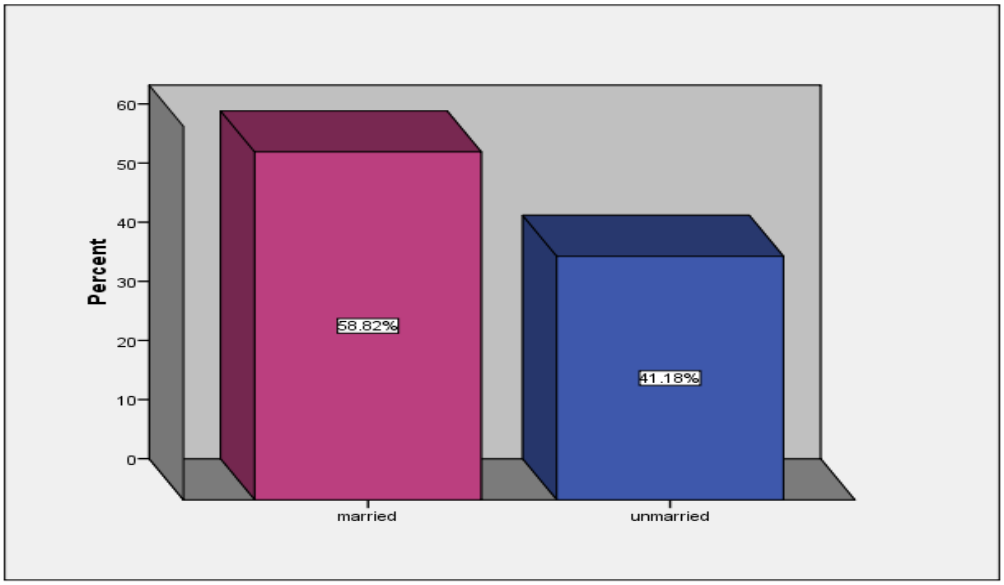

Figure (4.4) frequency distribution of marital status

Table (4.5) frequency distribution of finding

	Frequency	Percent	Valid Percent	Cumulative Percent
focal lesion	1	2.9	2.9	2.9
hematocele	2	5.9	5.9	8.8
hydrocele	17	50.0	50.0	58.8
hydrocele + spermatoceles	5	14.7	14.7	73.5
hydrocele + Varicocele	4	11.8	11.8	85.3
hydrocele + simple cyst	1	2.9	2.9	88.2
simple cyst	1	2.9	2.9	91.2
spermatoceles	2	5.9	5.9	97.1
spermatoceles + Varicocele	1	2.9	2.9	100.0
Total	34	100.0	100.0	

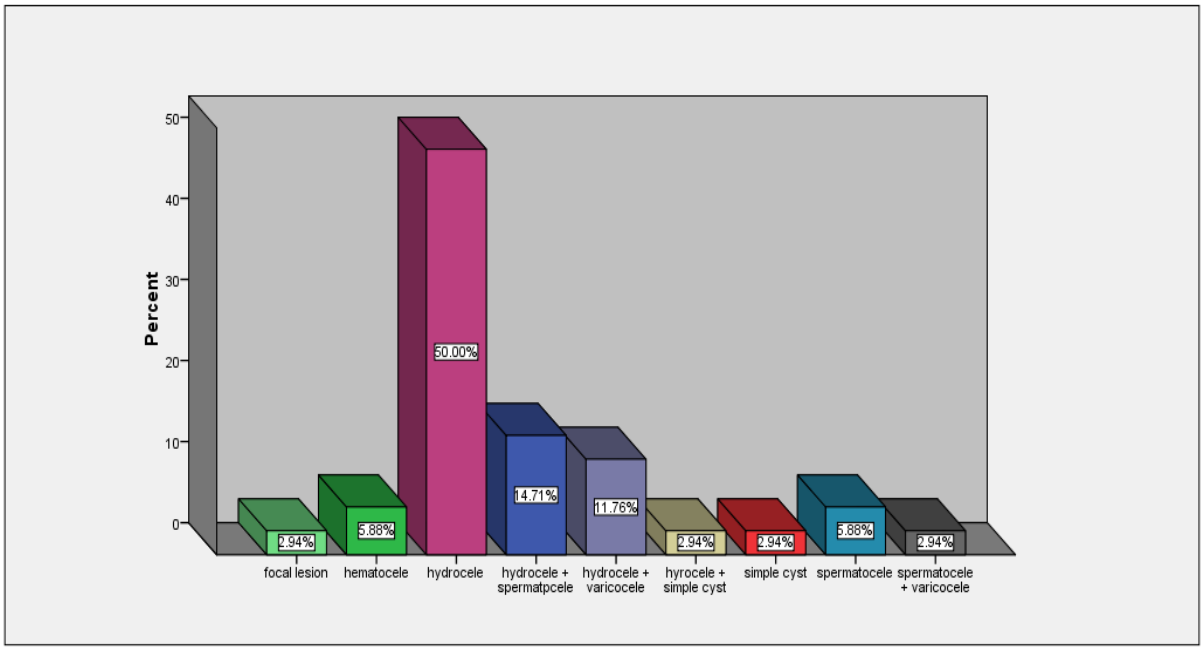

Figure (4.5) frequency distribution of finding

Table (4.6) cross tabulation age and final diagnosed

Diagnosed	Age group						Total
	1-15 years	16-30 years	31-45 years	46-60 years	61-75 years	more than 75 years	
focal lesion	0	0	1	0	0	0	1
hematocele	0	1	0	0	1	0	2
hydrocele	1	7	3	2	4	0	17
hydrocele + spermatpcele	0	1	2	0	0	2	5
hydrocele + varicocele	1	0	2	1	0	0	4
hyrocele + simple cyst	0	0	1	0	0	0	1
simple cyst	1	0	0	0	0	0	1
spermatocele	0	1	0	0	1	0	2
spermatocele + varicocele	0	0	0	1	0	0	1
Total	3	10	9	4	6	2	34
P value =0.137							

Table (4.7) cross tabulation weight and final diagnosed

Diagnosed	Weight			Total
	12-32 kg	54-74 kg	75 -86 kg	
focal lesion	0	1	0	1
hematocele	0	1	1	2
hydrocele	1	13	3	17
hydrocele + spermatpcele	0	3	2	5
hydrocele + varicocele	1	2	1	4
hyrocele + simple cyst	0	0	1	1
simple cyst	1	0	0	1
spermatocele	0	2	0	2
spermatocele + varicocele	0	0	1	1
Total	3	22	9	34
P value =0.166				

Table (4.8) cross tabulation occupation and final diagnosed

diagnosed	occupation						Total
	child	dealer	military student	officer	ranker	student	
focal lesion	0	0	1	0	0	0	1
hematocele	0	0	0	2	0	0	2
hydrocele	0	3	3	4	5	2	17
hydrocele + spermatpcele	0	0	0	4	0	1	5
hydrocele + varicocele	0	1	0	2	0	1	4
hyrocele + simple cyst	0	1	0	0	0	0	1
simple cyst	1	0	0	0	0	0	1
spermatocele	0	1	0	0	1	0	2
spermatocele + varicocele	0	0	0	0	1	0	1
Total	1	6	4	12	7	4	34
P value =0.664							

Table (4.9) cross tabulation marital status and final diagnosed

Diagnosed	Marital status		Total
	married	unmarried	
focal lesion	0	1	1
hematocele	1	1	2
hydrocele	10	7	17
hydrocele + spermatpcele	3	2	5
hydrocele + varicocele	2	2	4
hyrocele + simple cyst	1	0	1
simple cyst	0	1	1
spermatocele	2	0	2
spermatocele + varicocele	1	0	1
Total	20	14	34
P value =0.005			

Chapter Five

Discussion, Conclusion and Recommendation

Chapter Five

Discussion, Conclusion and Recommendation

5.1 Discussion

The study of causing scrotal sac swelling show that In (tables 4.1) which show frequency distribution of age ,the largest age effected by scrotal swelling (16-30 y) and the lowest age effected by scrotal swelling (more than 75y). In table (4-2) which show frequency distribution of weight ,the largest weight effected by scrotal swelling (54-75 kg) and the lowest weight effected by scrotal swelling (12 -32 kg).

In table (4-3) which shows frequency distribution of occupation, the largest occupation effected by scrotal swilling is officer and the lowest occupation effected by scrotal swelling is child.

In table (4-4) which shows frequency distribution of marital status, married patient 58.8% more effected than unmarried patient 41.2%.

In table (4-5) which show frequency distribution of finding , the largest cause which causes scrotal swelling is scrotal hydrocele 50% , this study agree with (Zaid Hadi et al, 2016).

In table (4-6) which show cross tabulation age and final diagnosed, the correlation between age and final scrotal swelling causes is weak ,no significant at P value =0.137.

In table (4-7) which show cross tabulation weight and final diagnosed ,the correlation between weight and final scrotal swelling causes is weak , no significant at P value =0.166.

In (table 4-8) which show cross tabulation occupation and final diagnosed, the correlation between occupational and scrotal swelling cases is strong correlation and significant at P value =0.005.

In (table 4-9) which show cross tabulation marital status and final diagnosed, the correlation between marital status and scrotal swelling causes is weak correlation and no significant at P value =0.664.

5-2 Conclusion:

This study was proved its hypothesis that; the ultrasound is a reliable and accurate in diagnosis of scrotal disorders and differentiates between normal and diseased scrotal.

U/S scanning is a good diagnostic tool for diagnosis of scrotal disorders and more accurate in diagnose of scrotal swelling causes.

The largest age effected by scrotal swelling (16-30 y) and the lowest age effected by scrotal swelling (more than 75y). The largest weight effected by scrotal swelling (54-75 kg) and the lowest weight effected by scrotal swelling (12 -32 kg).The largest occupation effected by scrotal swelling is officer and the lowest occupation effected by scrotal swelling is child. Married patient 58.8% more effected than unmarried patient 41.2%. The largest cause which causes scrotal swelling is scrotal hydrocele 50%. The correlation between age and final scrotal swelling causes is weak, no significant at P value =0.137. The correlation between weight and final scrotal swelling causes is weak, no significant at P value =0.166. The correlation between occupational and scrotal swelling cases is strong correlation and significant at P value =0.005. The correlation between marital status and scrotal swelling causes is weak correlation and no significant at P value =0.664.

5-3 Recommendation

Study recommended should introduce the modern ultrasound machines and increase the training institutes of ultrasound and computer programs for increasing the sonologists skills and experiences.

The author recommended that the government should be increasing the specialist hospitals for scrotal diseases because they increased in Sudanese now days.

Further studies should be carried out in this field on many aspects such as increasing the number of patients, to show the relation between scrotal swelling and causes, comparing between the role of U/S scanning and other diagnostic tools, using color Doppler ultrasonography and histopathology.

References

Carol M. Rumack,(et al.)2011 Diagnostic Ultrasound, 4th Edition Mosby Inc, An Affiliate Of Elservier Inc.

P.E.S Palmer.1995.Manual of Diagnostic Ultrasound , University of California Davis,California ,USA World Health Organization Geneva .152-153

Ada Kessler, MD, ShmuelMeirsdorf, MD, Moshe Graif, MD,Paul Gottlieb, MD, Simon Strauss,MBChB , 2005, Intratesticular Varicocele Gray Scale and Color Doppler Sonographic Appearance

Peter H. Kevin M Abigail T 2010. Diagnostic Ultrasound Physics And Equipment 2nd Edition . Cambridge University Press,New York.

Choyke PL, Glenn GM, Wagner JP, Lubensky IA, Thakore K, Zbar B, Linehan WM, et al (1997) Epididymal cystadenomas in von Hippel-Lindau disease.

Cook J, Bewbury K. 2000; the changes seen on high resolution ultrasound in orchitis. Clinical Radiology

Cook JL., DewburyK. (2000). The changes seen on high-resolution ultrasound in orchitis.

Dogra, V. S., Gottlieb, R. H., Rubens, D. J. and Liao, L. 2001: Benign intratesticular cystic lesions: US feature.

El-Senoussi Mohamed A., Nabil K. Bissada, Salah El-Akkad, Agop Y. Bedikian, RafikMorcos, Colin Bull. (2006). Epidemiology and clinical characteristics of testicular tumors in Saudi Arabia: King Faisal specialist

hospital and research centre experience. Journal of Surgical Oncology: Volume 35, Issue 1, pages 39–41.

ErcanKocakoc, MDa, Shweta Bhatt, MDb, Vikram S. Dogra, MDb, January 2007 Ultrasound Evaluation of Testicular Neoplasms

Henry M. Rosevear, AlekMishail, YefimSheynkin& Moshe Wald Unusual (September 2009).scrotal pathology Nature Reviews

Purushothaman, Sellars, Clarke, Sidhu, (2007), Intratesticular hematoma: differentiation from tumour on clinical history and ultrasound appearances in two cases

Stewart VR, Sellars ME, Somers S, Muir GH, Sidhu PS. Spleno gonadal fusion: B-mode and color Doppler sonographic appearances. J Ultrasound Med 2007; 23:1087–90.

Ross and Wilson.2oo1.anatomy and physiology , 9th ed. Churchillivingstone. British library. 13,p 350-359.

Appendices

Appendix 1

Image (1) 54 days came to hospital and department for scrotal swelling

Final diagnosis: - Rt scrotal cyst

Image (2) 8 years old complain of scrotal pain and lt swelling

Final diagnosis: - hydrocele

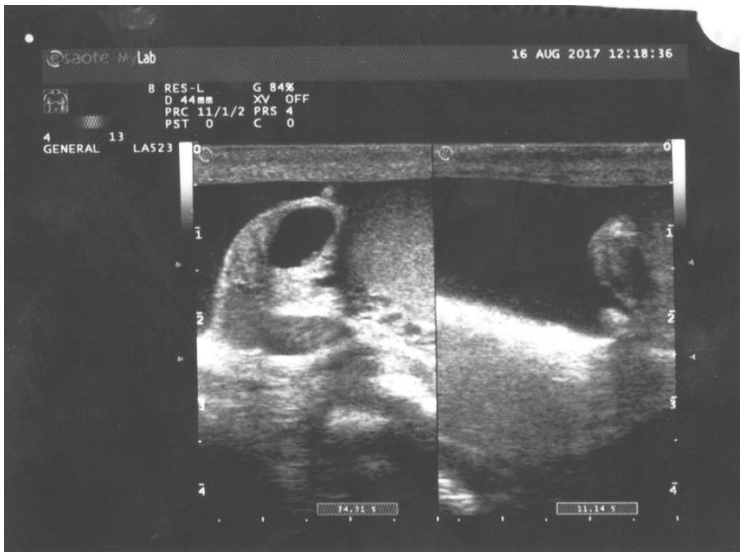

Image (3) 80 years old complain of scrotal pain and lt swelling

Final diagnoses: - scrotal hydrocele and Epididymal cyst

Image (4) 74 years old complain of scrotal pain and lt swelling

Final diagnoses: - Epididymal cyst

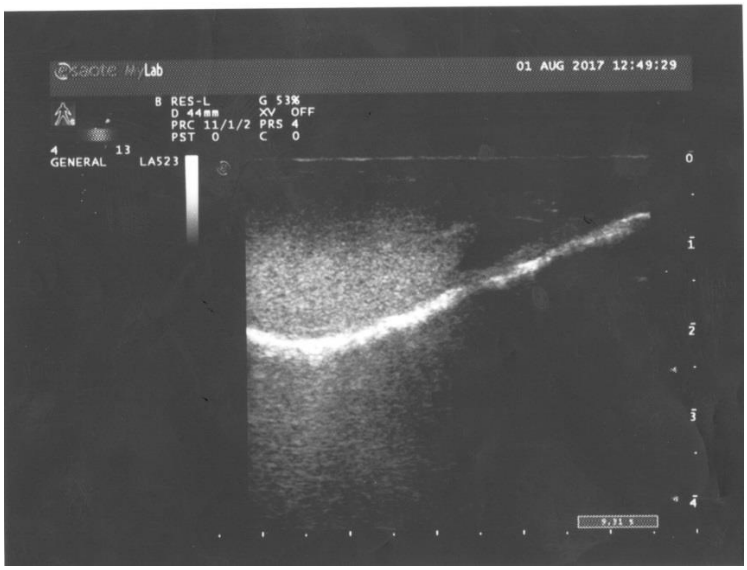

Image (5) 35 years old complain of scrotal pain and swelling (truma)

Final diagnoses: - sever hydrocele

Image (6) 20 years old complain of scrotal pain and swelling (trauma)

Final diagnoses: - hydrocele + speramatocele

Image (7) 40 years old complain of scrotal pain and swelling

Final diagnoses: - hydrocele

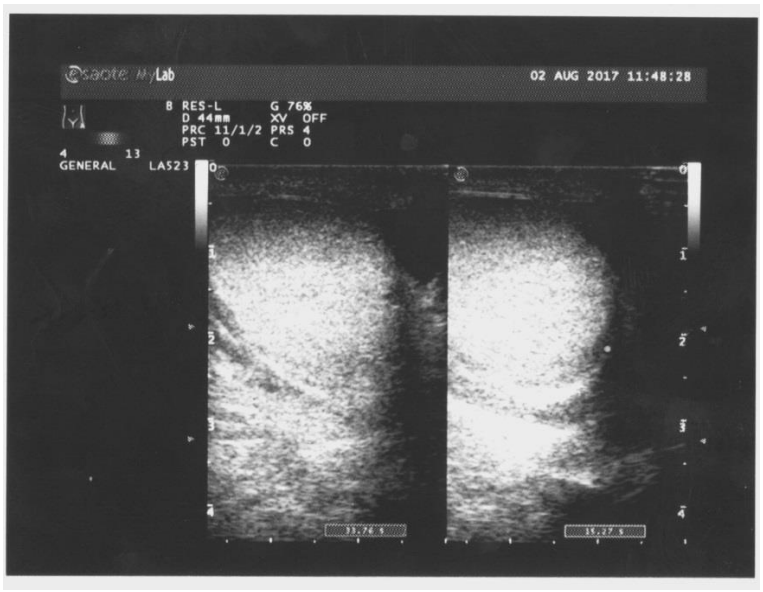

Image (8) 50 years old complain of right scrotal pain and swelling

Final diagnoses: - hydrocele

Image (9) 24 years old complain of right scrotal swelling ,no pain

Final diagnoses: - hydrocele

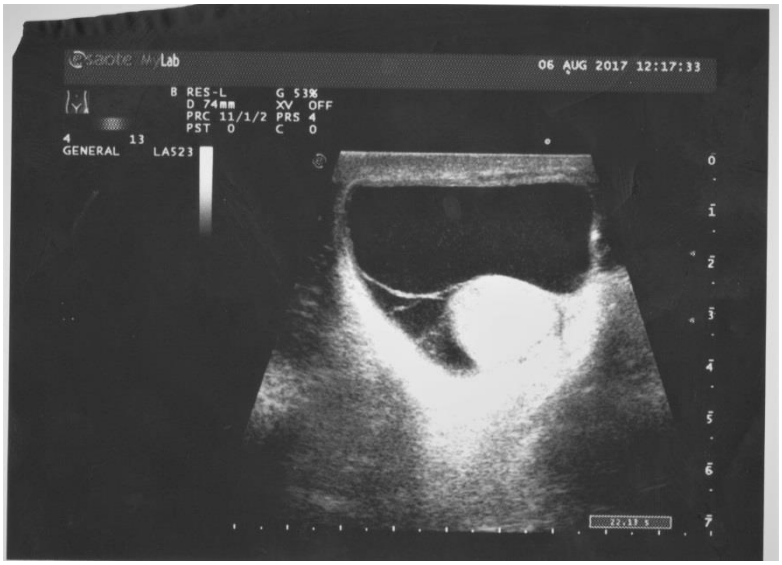

Image (10) 65 years old complain of both scrotal swelling and pain

Final diagnoses: - hydrocele, septation

Image (11) 45 years old complain of scrotal swelling and pain

Final diagnoses: - hydrocele, simple cyst

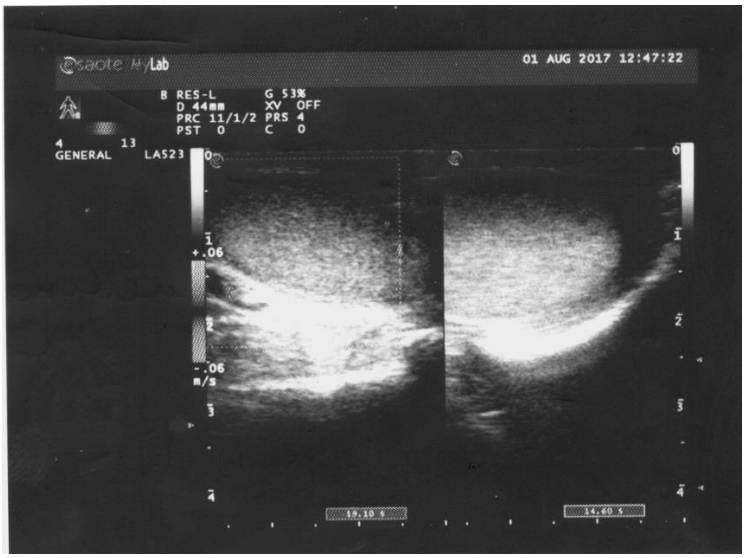

Image (12) 45 years old complain of scrotal swelling and pain

Final diagnoses: - hydrocele

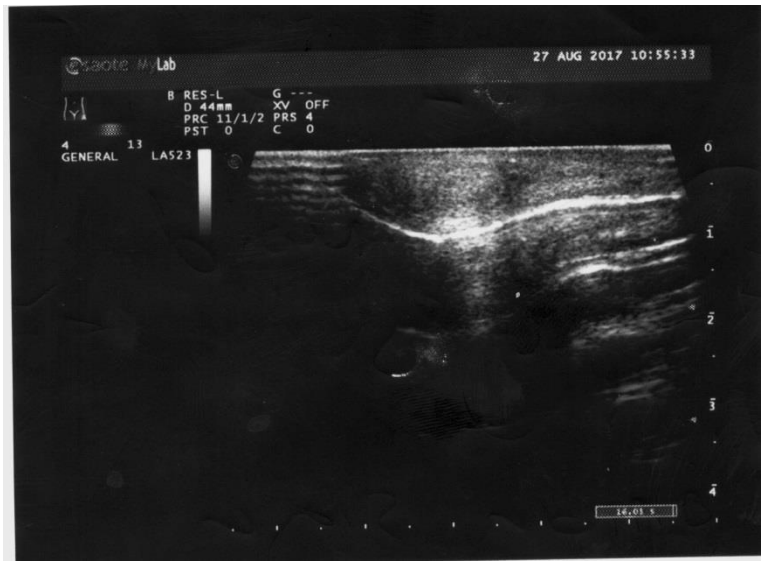

Image (13) 52 years old complain of scrotal swelling and pain

Final diagnoses: - dermoid cyst (onion sign)

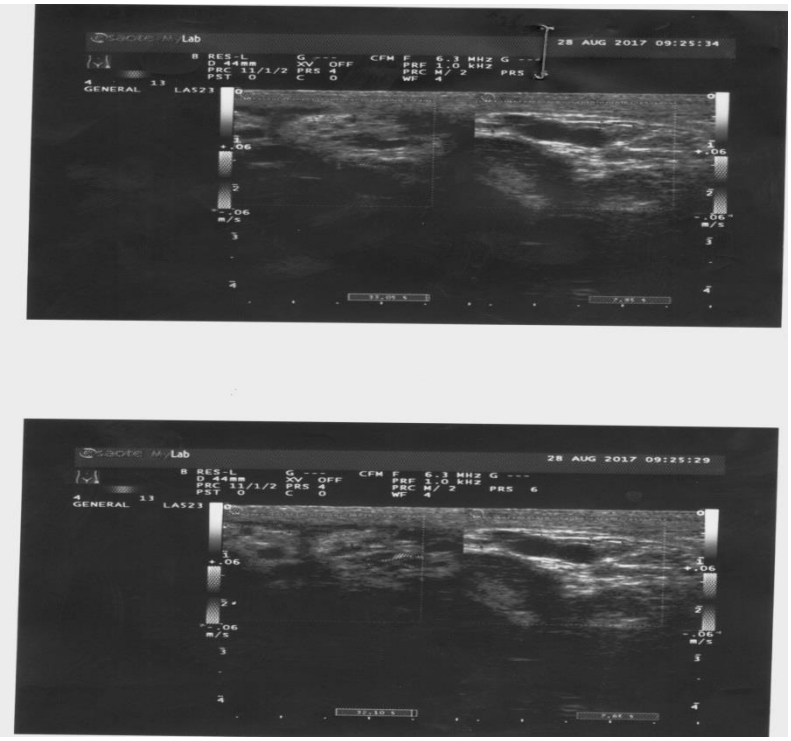

Image (14) 52 years old complain of scrotal swelling and pain

Final diagnoses: - bilateral Epididymal cyst + varicocele

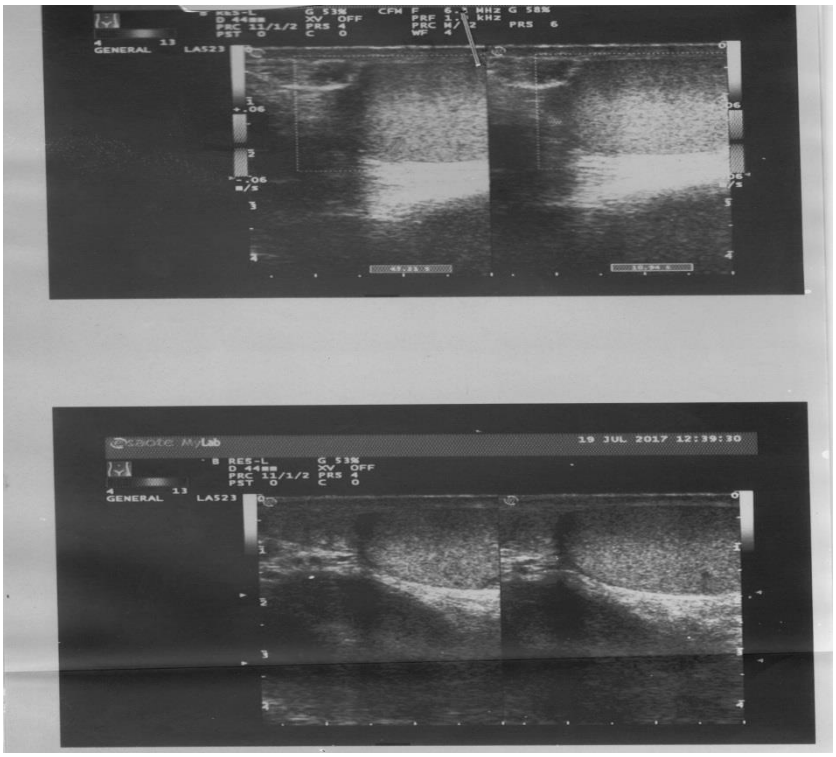

Image (15) 19 years old complain of scrotal swelling and pain

Final diagnoses: - hydrocele

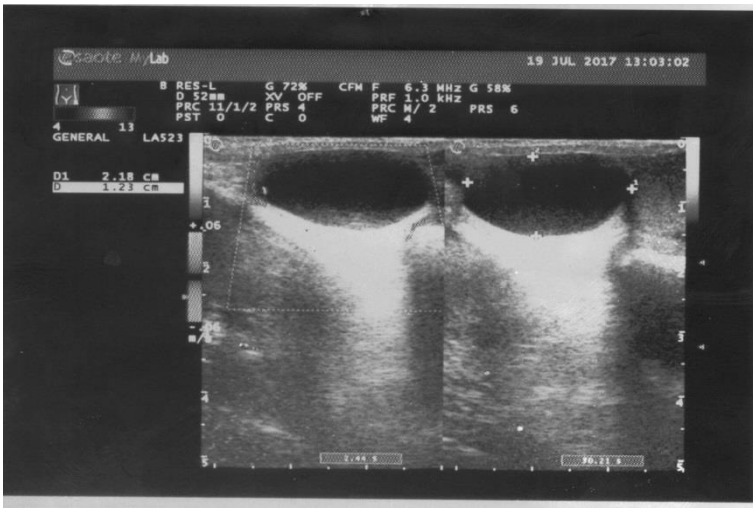

Image (16) 19 years old complain of scrotal swelling and pain

Final diagnoses: -simple cyst

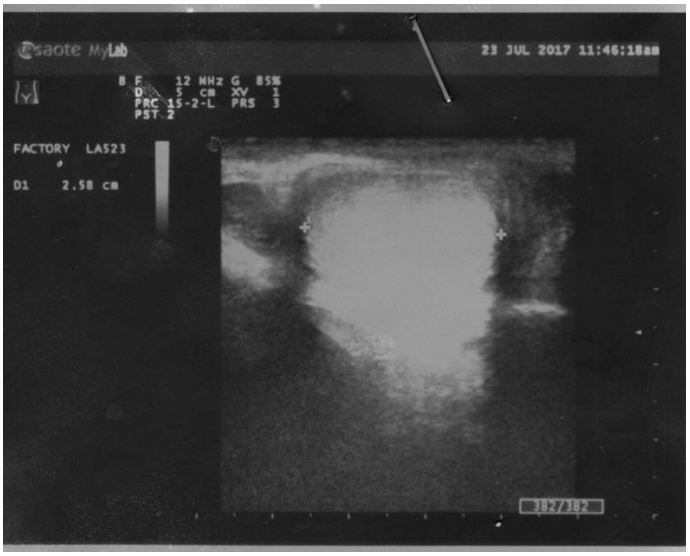

Image (17) 19 years old complain of scrotal swelling (truma)

Final diagnoses: -hydrocele

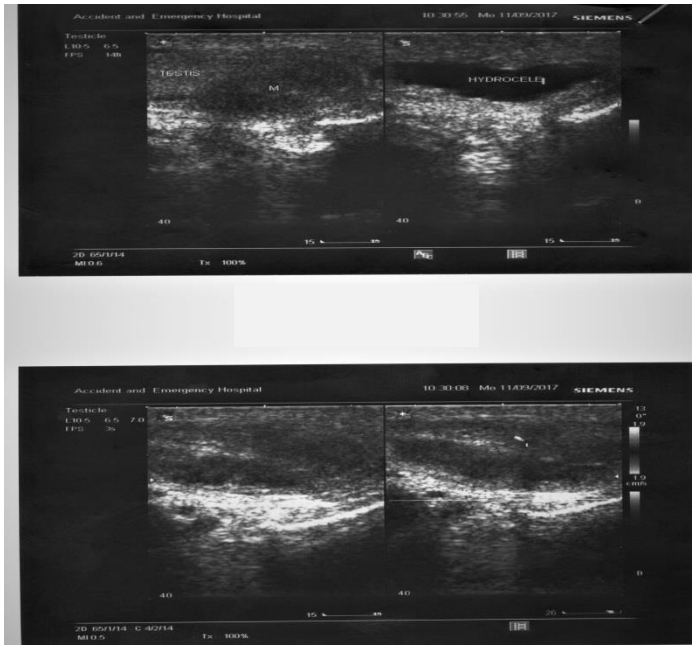

Image (18) 35 years old complain of scrotal swelling (truma)

Final diagnoses: -hydrocele

Appendix 2

Data Collection Sheet

No	Age	Marital status	Occupation	Weight	Final diagnosis