Role of Interventional Radiology in Treatment of Varicocele.

Submitted for the partial fulfillment
of the Master Degree in Radiodiagnosis

By:
Mostafa Atef Mohamed Fathy
M.B.B.C.H.

Supervised By:
Prof. Dr. Husam Fahmy Abd El-Hameed
Professor of Radiodiagnosis, Faculty of Medicine
Ain Shams University

Dr. Omar Farouk Kamel
Lecturer of Radiodiagnosis, Faculty of Medicine
Ain Shams University

Faculty of medicine
Ain Shams university
2016

Acknowledgment

I would like to express my deepest appreciation and gratitude to ***Prof. Hussam Fahmy*** for helping me choose this important and up-to-date subject, and for his continuous and unconditioned guidance and support.

I would also like to thank ***Dr. Omar Farouk,*** for his patience and meticulous remarks which have helped me keep this essay structured, organized and concise.

I would also like to extend my gratitude to ASU Interventional radiology unit and team for introducing me to the procedure of vaicocele embolization and making me familiar with its technical aspects.

Thanks are due to my friends and colleagues in the Radiology department of Ain Shams University for helping me in many ways throughout my residency and in writing this essay.

Last but not least, I thank my family, for being there for me along the road , and for whom I owe everything I am , and will ever be .

List of contents

Title	Page

List of figures

List of tables

List of abbreviations :

IVC : inferior vena cava.

ISV : internal spermatic vein.

SDS : sodium tetra-decyl sulphate **.**

PP : Pampiniform plexus **.**

LSV : Left spermatic vein.

RSV : Right spermatic vein .

LTA : Left testicular artery .

RTA : Right testicular artery .

Introduction

Variocele is a common clinical condition with vast importance in reproductive medicine practice , being Found in 15% of male population ,35% in those presented with primary infertility , and 80 % in those with secondary infertility (***Alsaikhan et al., 2016)***

Varicocele is defined as dilated pampiniform plexus of veins which drains the testicles , Normal caliber of the pampiniform plexus of veins ranges from 0.5 -1.5 mm , if the diameter exceeds 2 mm , the diagnosis of varicocele is made (***Salam, 2013).***

Varicocele diagnosis is a multi-disciplinary process , involving physical examination by palpating the scrotal sac , color Doppler examination which has a sensitivity of 97% and then the assessment of varicocele effect on semen analysis and other laboratory parameters ***.(Choi et al. , 2013).***

Varicocele is potentially treatable with wide range of treating modalities . Early detection and treatment had been proved to have a positive impact on fertility rate , one or more semen parameters and a significant improvement in sperm DNA. (***Tiseo et al , 2016).***

The indications of non medical intervention for clinically significant varicocele include infertility or subfertility specially with impaired semen parameters , hypogonadism, scrotal pain, and testicular atrophy .Treatment options for varicocele can be divided into two major categories: (1) percutaneous occlusion, by intravenous injection of various materials to occlude the varicoceles and (2) surgical ligation or clipping of the varicoceles to prevent venous reflux. (***Chan , 2011).***

Surgical treatment, has represented the elective method of treatment of varicocele for decades , yet because of the high frequency of venous collaterals, surgery is associated with recurrence of the disease or persistence of venous reflux in the pampiniform plexus in 0%–28% of patients. (***Shlansky-Goldberg et al.,1997).***

Varicocele treatment by percutaneous embolization of the internal spermatic vein is a safe and effective minimally invasive procedure. Its very low morbidity and complication rates, high long-term rates of success and demonstrated cost effectiveness relative to surgery have led many authors to believe that it should have the upper hand over surgical option or at least a valuable alternative to it .***(Wunsch et al , 2005).***

The percutaneous varicocele embolization procedure usually is performed on an outpatient basis under local anesthesia ,under aseptic conditions.. (***Beecroft, 2007).***

In recent studies, technical success rates of varicocele embolization are 92.4%–96%. Recurrence rates are < 2%–4%among those suffering from infertility. In the pediatric and adolescent population, long-term recurrence rates in those for whom the procedure was initially technically successful are 7%and 11%.Most of the patients in those studies have unilateral left-sided varicoceles, though right-sided varicoceles are also included (***Alqahtani et al., 2004).***

The complications of percutaneous therapy are infrequent and usually mild. injecting sclerosants is infrequently associated with thromobophlebitis , while Coil migration is a rare complication that is always linked to excessively distal release. Reported cases to date have been asymptomatic.

Varicocele embolization is a minimally invasive procedure , and because of that , major complications are rare . Despite the fact that venous vascular perforation is common during the procedure , it's rarely associated with any clinical symptoms .Multiple studies stated that there's 0-12% risk of developing post operative

hydrocele , 3-3.7% risk of developing epididymitis and 0% risk of developing chronic scrotal pain .(***Halpern et al., 2015).***

Aim of work

To elaborate the growing role interventional radiology plays in the management of patients with Varicocele and to compare it to the outcome of the traditional surgical techniques as regarding the success rate , recurrence rate and effect on infertility .

CHAPTER ONE

ANATOMY

CHAPTER ONE

Anatomy

Testis is a paired ovoid organ responsible for the male reproductive function , it measures approximately 25ml in volume , with average dimensions being 3.5-5 x 3 x 3 cm .it is covered by a tough fibrous capsule called tunica albuginea , which invaginates posteriorly forming the mediastinum testis, from which multiple septa traverses the testicles dividing it into seminipherous tubule, the structure that is lined by cells responsible for the production of sperm and nutrient fluid **(Figure - 1)**.

The next outer layer is the tunica vaginalis with its two layers , the visceral layer which is in contact with the testis , epidiymis and vas deference , The other layer is the parietal layer which is in contact with the internal spermatic fascia.

The epididymis is shaped like a comma , a single fine tubular structure averaging around 6 meters in length . It is highly convoluted and compressed to the point that it appears solid. It is situated on the posterior border of the testis, and is composed of 3 parts: the head ,body ,and tail. The epididymal head lies at the upper pole of the testis, receiving the seminal fluid from the ducts

of the testis ,then allows the passage of the sperm into the distal portion of the epididymis. The epididmyis serves to allow space for storage and maturation of sperm .The narrow tail continues as the vas deference**(Swartz et al. , 2006).**

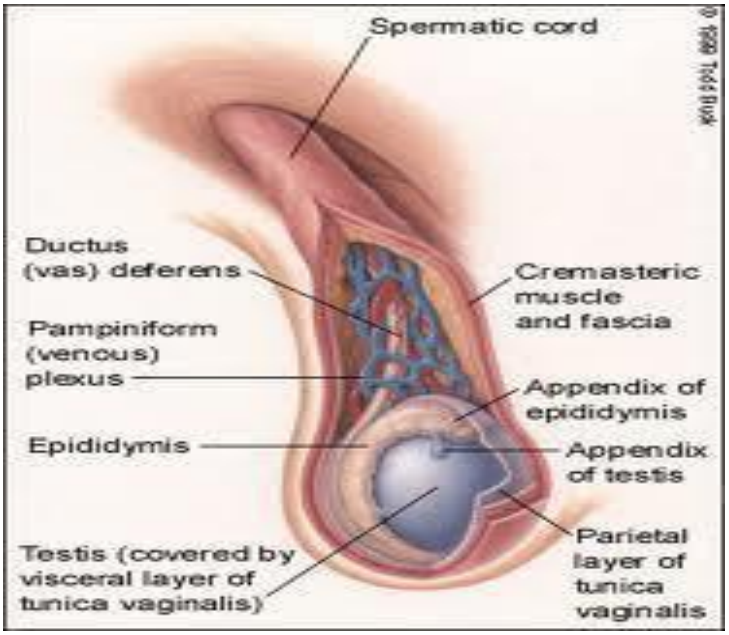

Figure 1- Testicular anatomy (Agur and Dalley 2009)

The appendix testis is a pear-like shaped structure that is the remnant of the cranial end of the paramesonephric duct. It is an embryonic genital duct partly forming the uterus in females. It is found approximately in 92% of all testes. It is located typically in the superior testicular pole**(Figure -2)** .

The appendices of the epididymis are remnants of the cranial end of the mesonephric (wolffian) duct, the embryonic duct that forms the vas deference in males. This is located in approximately 23% of testes. Its location may vary, but it usually projects from the head of the epididymis **(Figure -3).**

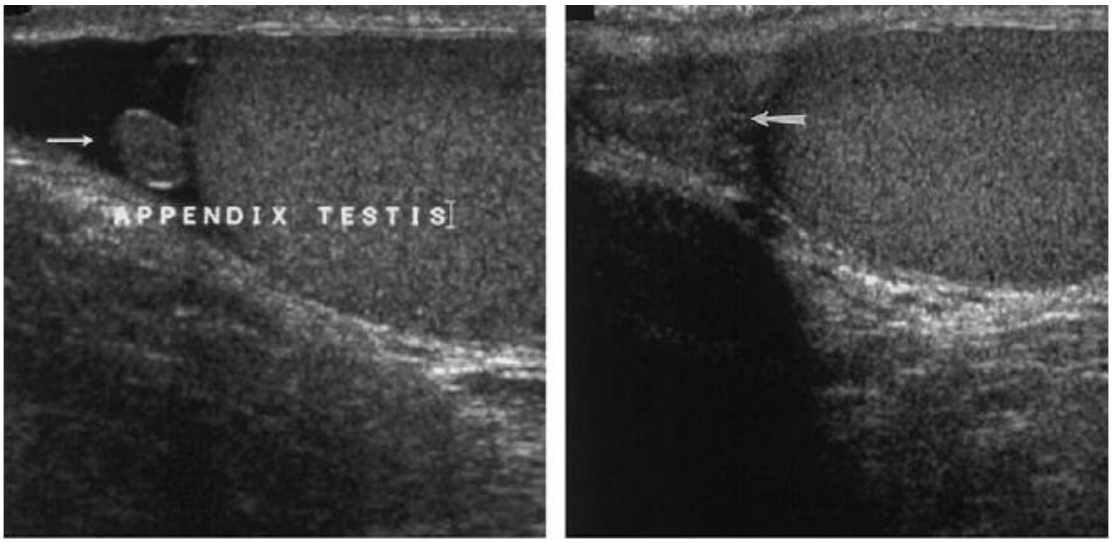

Figure 2-(a)Longitudinal US scan of a normal testis in a 26-year-old man shows the appendix testis (arrow) as a hypoechoic structure. The presence of hydrocele renders the appendix testis visible. (b) Longitudinal US scan of a normal epididymis in a 24-year-old (Dorga et al., 2003).

Figure 3-Gray-scale high resolution ultrasound with linear-array transducer of the scrotum reveals appendages of the upper pole of the testis and a smaller in the head of epididymis (Sellars 2003).