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# A RETROSPECTIVE STUDY OF SCROTAL PAIN FOLLOWING VARICOCELECTOMY, CAUSES AND MANAGEMENT

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## ABSTRACT

An average of 8–15% of inactive men will develop varicocele, a common urological ailment. The incidence is greater in male patients suffering from primary or secondary infertility; in fact, between 35 and 80% of varicocele cases occur in this group. Clinical manifestations of a varicocele typically include an asymptomatic mass that looks like a "bag of worms", infertility, persistent pain in the scrotum, and a lump. When other treatments for varicocele fail, the patient may be referred for surgery. Regrettably, some individuals may experience persistent scrotal pain due to nutcracker syndrome, referred pain, neuralgia,

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ureteral lesions, varicocele recurrence, hydrocele, or neuralgia. Doctors should manage scrotal pain following surgery based on the patient's symptoms, which may include these concerns. Taking into account a multitude of variables can better predict the success rate of varicocele surgery. Before deciding whether surgery is necessary and what course of action is optimal, clinicians should contemplate these factors. If patients follow these steps, surgery is more likely to be successful and complications like postoperative scrotal pain are less likely to occur. Techniques and results Between July 2021 and July 2023, 212 patients were diagnosed with varicocele. Surgeons from the urology department at Baquba Teaching Hospital conducted the varicocelectomy. The purpose of this retrospective study is to determine the frequency of scrotal pain following varicocelectomy.

**Keywords** Varicocelectomy, retrospective study, scrotal pain, lump, surgery.

## Introduction

Varicocele is when the veins in the spermatic cord and the scrotum become enlarged. Men who suffer from scrotal varicocele pain often see a doctor between 2% and 10% of the time. The source of this discomfort could be one of several things. The elevated testicular temperature and the compressed neural fibres generated by the dilated venous complex are the root causes of the disorder. Some of these variables include hormone changes, low blood oxygen levels, high intravascular pressure, and the backflow of toxic chemicals produced by the kidneys or adrenal glands. When varicoceles are present, the patient may have dull, excruciating, or throbbing pain in either the testicle or the scrotum, or both. Extreme, sharp, or piercing agony may very rarely occur in the buttocks. Initially, we address the pain in the testicles caused by varicocele. To perform endoscopic varicocelectomy in carefully selected patients, we use a non-invasive technique that is both cautious and requires a time of observation. Treatment for testicular

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discomfort alleviates about 80% of instances when a varicocele is palpable. Conducted varicocelectomy procedures with microsurgical techniques. The low risk of complications and high success rate of these treatments have contributed to their rising popularity. Varcocele severity and features. The patient's weight, the duration of discomfort, the efficacy of prior conservative treatments, and the surgical strategy are all variables that can be used as markers. to ensure a successful varicocelectomy.

## Etiology

It is yet unknown what causes varicocele pain specifically. Infertility is caused by varicocele; however, hypoxia, oxidative stress, hormonal imbalances, increased testicular temperature and venous pressure, adrenal or kidney reflux of toxic chemicals, and other factors may influence spermatogenesis and Leydig cell function [6–11]. These testicular injuries not only hurt, but they can also make it challenging to conceive. When the dilated venous complex presses on the local nerve fibres, varicocel pain becomes much more excruciating [12].

## Presentation and assessment

Pain in the testicles, scrotum, or groin that is dull, aching, or throbbing is a common symptom of varicocele in women. In really unusual cases, the pain could be sharper and more excruciating. Scrotal heaviness, or varicocele, is a common symptom of strenuous physical activity, such as prolonged standing, running, or other strenuous physical activities. Included in the patient's medical history should be details regarding the location, duration, severity, onset, and evolution of the pain, as well as any dissemination to other body parts. The patient's sexual and physical activity levels, as well as their urination and defecation patterns, might be discussed to pinpoint the factors that are causing or alleviating their symptoms. Although varicocele usually causes no symptoms, a small number of men experience testicular pain. Adolescents often discover varicocele by mistake

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during physical exams, whereas adult males usually discover it during infertility assessments. Consequently, the gold standard for diagnosing varicocele is a thorough physical examination. Position the patient either on their side or back as you examine and palpate their scrotum. Before beginning the evaluation, place the patient in a warm room to help relax the dartos and cremaster muscles; then, choose whether or not to conduct the Valsalva manoeuvre. In cases of grade 2 varicocele, the procedure is perceptible but not visible, whereas in cases of grade 3, the varicocele is readily apparent [13]. Doppler ultrasonography can detect grade 0 (subclinical) varicocele even when it is not palpable. It may not always be required to conduct an imaging workup when a patient with varicocele reports testicular pain. When a thorough physical examination fails to detect varicocele or presents too many challenges, a numerical evaluation and a definitive diagnosis can be obtained by imaging investigations. In addition to excluding other potential intrascrotal or abdominopelvic disorders, the exam provides an exact measurement of both testicles. Pelvic doppler ultrasonography is the most common and important imaging test for men.

pain in the testicles. This budget-friendly, non-invasive, extremely sensitive technology works well in the outpatient room. Additionally, comprehensive anatomical pictures of areas linked with related disorders can be obtained using computed tomography (CT) or magnetic resonance imaging (MRI) scans of the abdomen and pelvis. pain in the testicles. A proper diagnosis is necessary in the event of testicular pain. No matter whether a varicocele is visible during a physical examination, a person with testicular pain still needs to find out what's causing their agony. Much space. Table 1 shows the many causes of chronic testicular pain, including transferred pain, postoperative pain, and scrotal discomfort [14]. Various scrotal problems, such as fluid retention, and tumours of the testicles, varicocele, spermatocele, and hydrocele, can cause testicular pain. You may experience some discomfort in the testicles following a vasectomy or hernia repair. Iatrogenic injury could be the source of the pain. Conditions such

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as indirect inguinal hernia and mid-ureteral stones are considered in the differential diagnosis of orchalgia to rule out other potential sources of transferred pain.

## Classification and evaluation

### Section 2.1: Comprehensive Medical Evaluation

In order to confirm the presence of varicocele, a thorough physical examination is necessary. We take a close look at the testicles and everything in them. To ensure that the test goes well, we usually put the patient in a warm room so their dartos and cremaster muscles don't become too tired. Conversely, blood vessel visibility may be impaired due to scrotal retractions. Examining a patient in both a standing and reclining position is considered normal procedure. In order to feel the bare scrotum, the examiner puts their hands on it. ensure that the umbilical chord is smooth and consistent. Because varicocele veins are twisted and dilated, they give the impression of a "bag of worms", and the Valsalva manoeuvre, which involves exhaling forcefully with a closed mouth to increase pressure in the abdomen, is a common tool for diagnosing and treating this condition. Every patient needs to inhale deeply and hold it while they apply pressure. The act of defecating is comparable to this procedure. Accordingly, the intra-abdominal and intrathoracic. The peripheral venous blood is encouraged to return to the heart by the lowered pressure. The varicocele ought to be more noticeable. Additional imaging procedures, like venography or ultrasound, may be used to confirm the diagnosis in addition to the regular medical evaluation. This is particularly true if there are no visible symptoms of the condition and the physical examination yields no results. The patient's weight is too high. The most important thing I can do is help with varicocele diagnosis and treatment planning. It is essential to evaluate the seriousness of the condition when diagnosing varicocele. Determine the best treatment plan. This is because there aren't any therapeutic regimens that everyone agrees upon, which can lead to confusion and inconsistency in treatment

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approaches for varicocele. Many other ways to classify things have been suggested. In or about 1970, Dubin. Amelar and colleagues defined the following criteria for a grading scale using an upright patient as an example: duty [18]. Grade 1 varicoceles are so small—less than 1 cm—that they can only be seen with a Valsalva manoeuvre, which is a technique where a person tries to exhale forcefully with a closed mouth and nose to increase pressure in the abdomen. Grade 2 varicoceles are not visible, despite their size (1-2 cm) and the fact that they are apparent when feeling the skin. Discernible. Varicocele Grade 3 is characterised by a size of more than 2 centimetres, making it visible even in the absence of a microscope. tactile perception. In 1994, Tauber continued the work of Dubin and Amelar by introducing a taxonomy that included Doppler-identified subclinical, non-palpable varicoceles. Its detection by Doppler ultrasonography is illustrated in Table 1 [19]. Combining a physical examination with imaging tests can lead to a more precise diagnosis. evaluation of varicocele. One common and safe way to obtain images is via ultrasonography. Using it, varicoceles can be accurately identified and graded. Sarteschi uses ultrasonography to rate varicoceles from 1 to 5 based on how much reflux and varicosities there are. CT and MRI scans can be used to find male pattern baldness. Magnetic resonance imaging (MRI) and other modern imaging techniques greatly improve the sharpness of anatomical pictures. Varicocele and other underlying health issues can be better detected in the pelvic region through advanced imaging techniques such as ultrasonography, CT, and MRI scans. conditions. An intravenous injection of contrast dye is used in a diagnostic process known as venography. This approach is superior for arranging the most successful surgical technique, is less invasive, and is more reliable for finding varicoceles. The gold standard for diagnosis is a combination of imaging studies and a thorough physical examination. The optimal method of treating varicocele must be established.

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## Section 2.2. Possible Varicocele Treatments, Surgical Options, and Outcomes

### Section 2.2.1. Methods that are less aggressive

Conservative methods of pain treatment may be more effective for patients with chronic pain in the beginning. Certain limitations may be imposed, such as when the patient is bedridden, when the scrotum is lifted or supported, and when performing perineal pelvic floor exercises [21]. This treatment may involve the use of nonsteroidal anti-inflammatory drugs and physical activity.

In addition, studies have demonstrated that phlebotrophic medications, including micronised pure A flavonoid fraction (MPFF), can reduce vein size while increasing vascular flexibility and tone. fluid retention. On the other hand, conservatives were against MPFF treatment, as no studies using a randomised placebo design are available at this time. When less invasive treatments have not worked, surgery may be the next step to take into account. When making surgical recommendations, a sperminogram is the main tool to use. limits, as well as persons struggling with testicular shrinkage, recurrent scrotal pain, and. Despite using gentle methods, I still can't conceive. A retrospective investigation shows that varicocele ligation is effective, a finding supported by other sources [16].

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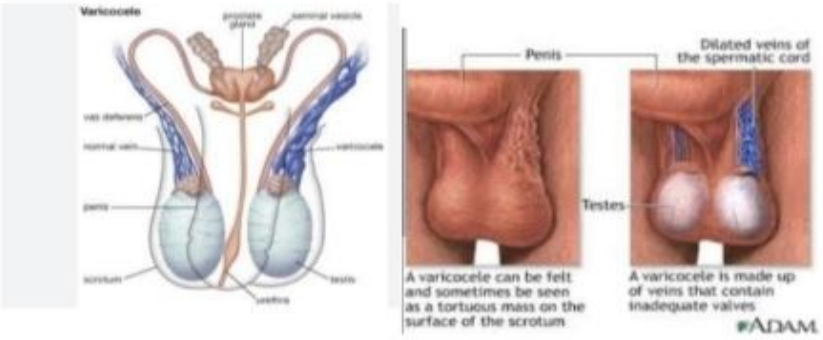
**Table 1.** Classification of varicocele.

| | Grade | Clinical | Vein Convolution | Nomenclature |
|---|---|---|---|---|
| Dubin and Amelar; Tauber | 0 | Not palpable but can be detected under Doppler ultrasonography | 0 | Subclinical |
| | 1 | Palpable only during a Valsalva maneuver | 0–1 cm | Small |
| | 2 | Easily palpable but not visible | 1–2 cm | Moderate |
| | 3 | Easily visible without the need for palpation | >2 cm | Large |
| | **Grade** | **Reflux** | **Varicosities** | **Testicular Hypotrophy** |
| Sarteschi | 1 | During a Valsalva maneuver | None | No |
| | 2 | During a Valsalva maneuver | Small | No |
| | 3 | Obvious during a Valsalva maneuver | Apparent | No |
| | 4 | Spontaneous reflux and increase during a Valsalva maneuver or standing | Present in all positions | Common |
| | 5 | Spontaneous reflux at rest without increases during a Valsalva maneuver | Venous dilatation in all positions | Yes |

**Table 12.4** Varicocele grading system

| Grade | Size | Definition |
|---|---|---|
| 0 | Subclinical | Detected only on USS |
| 1 | Small | Palpable only with Valsalva manoeuvre |
| 2 | Moderate | Palpable without Valsalva |
| 3 | Large | Visible through the scrotal skin |




## Section 2.2.2. Surgical Procedures

Surgery is used to remove varicoceles. Among its several names, the Palomo method describes the retroperitoneal high-ligation approach. The swollen testicles are surgically bound together during a varicocelectomy, veins and

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arteries to reduce varicocele pain (Table 2). In 1949 [23], Palomo proposed a widely utilised way to perform this procedure in the Palomo method. A surgical microscope allows for an open operation known as laparoscopy. When the surgeon has access to the retroperitoneal cavity, ligation of the testicular veins takes place. Regrettably, the collateral cannot be reached by the retroperitoneal approach, even though it could have been avoided had it been located near the internal inguinal ring rather than the testicular artery. A higher risk of recurrence may be associated with pampiniform plexus veins [24, 25]. Thus, closure of all dilated veins in the pampiniform plexus is an increasingly common substitute for microsurgical subinguinal varicocelectomy, which allows for the discovery and preservation of. The Palomo procedure has a lower remission rate for discomfort compared to microsurgical subinguinal varicocelectomy, which is one of the potential dangers.

Possible reasons for ongoing scrotal discomfort following treatment: 1. occurring again, 2. 3. referred pain, neuralgia

6. ureteral lesion 5. hydrocele, 6. mysterious nutcracker syndrome, and others.

**1.Recurrence**

Recurrent varicoceles are still common, despite surgical improvements. Pain that does not go away after treatment ends might have a variety of causes and return frequencies. This recurrence is assessed on the basis of several surgical procedures. Ultrasonography is recommended for the diagnosis and treatment of varicocele because it allows for an accurate assessment of recurrence during subsequent procedures, including those involving the patient's collateral veins and internal spermatic veins. Some have proposed a possible connection between the two. One potential treatment for recurring varicoceles is repeat angiographic embolisation. recovery area. A subinguinal varicocelectomy may be easier with the use of a microscope, according to the scientific literature, which suggests that this technique can enhance precision and reduce recovery time for patients.

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Delivery to the testis is the most effective treatment for recurrent varicocele because of its large effect. Recurrence rates are going down. Reportedly, a subinguinal varicocelectomy under the microscope is possible. Their capacity to detect and ligate leads to a decreased recurrence rate as compared to alternative approaches. As the surgical magnification increases, the larger veins become more apparent. Another advantage of the subinguinal technique is that the external oblique aponeurosis is preserved. While doing so, you lessen the likelihood of prolapse and post-operative abdominal wall weakness. Whatever the case may be, it is essential to personalise surgical procedures for each patient [17]. This involves considering the surgeon's history, the patient's anatomy, and any other relevant health information. A comprehensive evaluation is required for the successful management of recurrent varicoceles. a unique approach to care. Ultrasound imaging should be considered for evaluation. Microscopic subinguinal varicocelectomy with testicular delivery is required in case of recurrence. Alternate treatment options that successfully reduce the chances of recurrence can be considered.

occurrence can be accommodated. Still, prior to settling on surgical

It is crucial to tailor one's approach to every patient, and additional research is necessary. There has to be further study on the long-term effects of different surgical options. recurring varicoceles!

## 2. Neuralgia

Patients who have experienced scrotal pain for longer than three months and have already had both scans are eligible to be considered. If an upper urinary tract survey came back negative, it was thought that chronic scrotal content pain was present [18]. It was postulated that persistent scrotal pain is a result of Wallerian fractures. Nerve atrophy supplies the perivasal tissue, the vasal sheath, and the cremaster muscle. Lipomatous tissue obtained from spermatic cord biopsies taken from the posterior cord is the primary focus of the inquiry [12]. Possible non-

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invasive treatment choices include tricyclic antidepressants and pelvic floor exercises. Opioids, NSAIDs, and tranquillisers are all examples of such pharmaceuticals [21]. For temporary relief from spermatic cord obstruction, a topical anaesthetic injection may be an option to consider. A patient who has just undergone microsurgical spermatic cord denervation (MDSC) and is now experiencing scrotal discomfort will need individualised care. The subinguinal technique and transcutaneous magnetic stimulation of the spermatic cord (TMDSC) are two other procedures. surgery to be successfully executed. Before MDSC or TMDSC, an audit must be conducted. Researchers have used spermatic cord blocks to assess pain alleviation and forecast how well these treatments would work [21]. The spermatic cord must have all of its structures ligated (apart from the arteries) in order to perform MDSC. These systems are linked by the subinguinal route, which includes veins and lymphatics. The TMDSC, a more streamlined system, is in sharp contrast to this. Ligation of the tissues encircling veins and arteries, the interstitium between them, and the spinal cord's posterior area constitutes MDSC, a region of Wallenian degeneration. The internal spermatic cord is preserved, and the surgery time is reduced as a result. Results showed that compared to the other denervation method, MDSC required more time to operate. The pain reduction was equivalent and effective after 53 minutes of MDSC compared to 21 minutes of TMDSC rates, which vary between 82.1 and 32.1 per cent in MDSC and 83.3 to 93.1 per cent in TMDSC (Table 3). Neurones or spinal cords can be stimulated or removed during the procedure [16]. Scientists have shown that the tissues around the spermatic cord can alleviate chronic scrotal pain.

### 3.Referred Pain

Urinary tract infections (UTIs) can cause scrotal discomfort, as evidenced by examples such as orchitis and chronic prostatitis [65, 66]. The anterior scrotal nerve and the vaginal branch of the ilioinguinal nerve both have their origins in

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the same place, and both supply the scrotum with innervation. Sources of pain include the perineal division, the posterior cutaneous nerve of the thigh, and the genitofemoral nerve on the back and side, respectively [17]. This encompasses a wide range of painful disorders, including urolithiasis, abdominal aortic aneurysm, and intervertebral discs. Retrocecal appendicitis, knee discomfort, pudendal neuropathy, nerve root impingement, and back pain are some of the symptoms. Retroperitoneal neoplasms share the same pathway with the same nerves [18]. Pain in the scrotum could be a result of this. Conditions including neuropathy, chronic prostatitis, orchitis, and urologic lesions can be made worse by radiation since the kidney, testicle, and prostate all receive autonomic nerve supply. in every part of the vagina. A person's urinary tract is innervated through the autonomic plexuses. Neighbouring the renal and aortic areas are the superior hypogastric and inferior hypogastric regions. Sympathetic and parasympathetic impulses are conveyed by intricate networks of nerve fibres. Pain in the urinary tract occurs when sympathetic nerve fibres reach the

A retrograde path is used by the T10-L2 spinal cord manner. Colicky symptoms can be caused by various ureteral diseases, such as neoplasms and ureteric calculi. Because part of the ureter is above the obstructed area, the lower abdomen is in pain. the parcel. Symptoms that originate in the urinary system may occasionally spread to the flank. The dermatome T10-L2 is connected to the region of the lower back. Consequently, ureteral. Lesions are potential causes of scrotal pain. Chronic inflammatory epididymitis is a possible cause of skeletal discomfort after surgery. A history of infection, whether bacterial, viral, or post-operative, might have serious consequences. Bladder pain syndrome of uncertain origin is a disorder that can cause cystitis. Scrotal pain, pelvic aching, and lower urinary tract symptoms are all possible side effects for patients [19].

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**4. Hydrocele**

Disruption of testicular lymphatic outflow is one possible side effect of varicocelectomy, creating a water-filled sac after surgery. An extensive study conducted in 2018 found that hydrocele development occurred in approximately 0.6% of microsurgical subinguinal patients as a result of the procedure. The following percentages were used: 5.3% for open inguinal, 6.7% for laparoscopic, and 7.5% for transvaginal. The back of the abdomen, or the retroperitoneum, is involved in some procedures [16]. A collection of discoloured tissue is what hydroceles look like. A gap exists in the tunica vaginalis between the parietal and visceral layers. Hydroceles may appear at some point. Fluid absorption and production are not in sync with one another in the body. The parietal lymph nodes are where you can find the stomata. Alterations to the tunica vaginalis have been recorded by researchers [17]. This indicates that the testicles are reached by the space-lymphatic vessel located in the tunica vaginalis.

The lymphatic drainage from the testicles and the stomata carry the fluid to the nodes in the back and the area around the heart. The leak that occurs following a varicocelectomy may be explained by this. Microsurgery and lymphatic staining make it feasible to think about the lymphatic channels that are expanding. seen, decreasing the likelihood of hydrocele formation [24].

**5. Nutcracker Syndrome**

Left renal vein entrapment syndrome, generally known as anterior nutcracker syndrome or nutcracker syndrome, is characterised by the entrapment of the left renal vein. Its neighbours include the superior mesenteric artery (SMA) and the abdominal aorta. It can begin at a level lower than 35 in those with Nutcracker syndrome, at the T1 level of the abdominal aorta, or at the angle between the SMA and the abdominal wall. This sharp angle causes the left gonadal vein to enlarge in response to rising pressure in the left renal vein, which conveys signals to the

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lumbar spine. A prevalence of 0.1-3.2% is reported for anterior nutcracker syndrome, which the patient possesses. [12]

The formation of the retroaortic or circumaortic left renal vein can be caused by valvular defects. Put a little pressure on the left renal vein, which is toward the midsection. The aorta and spinal cord are both impacted by posterior nutcracker syndrome. Venous blood pressure. This illness can potentially lead to a tiny vein bursting in the kidney fornix. If you notice any pain on your left side, it could be because there is blood in your urine. Various abnormalities, including varicocele, often coexist with nutcracker syndrome [13]. Serious side effects can include scrotal pain, orthostatic proteinuria, left loin pain, abdominal pain, and other signs and symptoms. Serious side effects can also include renal failure, dysuria, and rapid heart rate [14]. Considering everything, nutcracker syndrome is frequently misdiagnosed. A nutcracker injury is more likely to occur in a person with a slender physique. The syndrome develops when the SMA and abdominal aorta create a more acute angle [25]. Nutcracker syndrome is identified by pressure gradients higher than 2 mmHg [16]. Following renal vein retrograde venography, the inferior vein-and-artery bed is examined. Computerised tomography angiography (CTA), which is a type of imaging that uses X-rays to create detailed pictures of blood vessels, allows for noninvasiveness and better accessibility, which are significant factors in its significance.

vein-and-artery bed. Computerised tomography angiography (CTA) allows for noninvasiveness and better accessibility, which are significant factors in its significance. Instead of "at", we utilise "the beak sign" when evaluating arteries and veins. An axial CT scan reveals narrowing of the left renal vein [17]. There is debate on how to treat Nutcracker syndrome. A cautious approach to treatment includes the following: medicine, especially ACE inhibitors, might cause weight gain. Aspirin use is linked to an increase in renal perfusion and orthostatic proteinuria, respectively, according to the literature [18]. When patients experience serious side effects, such as excessive bleeding, despite receiving

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conservative vein treatment, surgical intervention becomes the only option for treatment. Mesoaortic transposition, left renal vein transposition, and renal autotransplantation are three open approaches that have been considered [17]. Left renal vein endovascular stenting, laparoscopic left renal vein transposition, and gonadocaval are some of these techniques. You have options including minimally invasive surgery, transluminal balloon angioplasty, and bypass grafting. Nutcracker syndrome must be considered at all times. Blood, seemingly from nowhere, was discovered in my urine.

**Predictors of Treatment Outcome**

Prior to surgery, symptoms including a greater varicocele grade are noticeable. We have recorded varicose veins [19], larger vein diameter, younger age, body mass index (BMI), amount of ligations performed, length of time of pain prior to surgery, and surgical technique. The objective is to enhance surgical outcomes for patients suffering from painful varicocele. In 2020, the causes of the recurrence were investigated using a retrospective study. Microscopic subinguinal varicocelectomy was performed on 34 individuals diagnosed with varicocele, according to the study. The left side of the body had a more severe case of varicocele and a smaller dimension of expanded varicocele ($p = 0.024$). Veins significantly raised the likelihood of recurrence prior to surgery ($p = 0.002$) [14]. A higher likelihood of beneficial results is associated with minor discomfort, according to the study. The side that is slightly achy has won hands down [24]. The time it takes for varicocele pain to start and for surgery to be scheduled has decreased to less than six months, according to a study published earlier this year by Park et al. pain alleviation ($p = 0.004$) [39]. Alternate studies, however, came to no different conclusions. Prior to and following surgery, patients may have some discomfort [24]. A higher body mass index was also associated with reduced pain, according to the researchers [18]. Nevertheless, different surgical techniques may influence the results. A retrospective cohort study, an analysis of

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36 papers in total [12], and another study are all being compared. Therefore, microsurgical varicocelectomy performed inguinally or subinguinally is considered an open treatment. 1.05% recurrence rate (0.00-3.57%). These symptoms should be recognised by urologists. Take all of these factors into account when you evaluate patients before and during a varicocelectomy. keeping going with it.

## Materials And Methods

From July 2021 to July 2023, 212 people were diagnosed with varicocele. The varicocelectomy was done by the surgeons of the urology department in Baquba Teaching Hospital. We were able to do a retrospective study looking at the patients' medical records. Most of the 104 people studied underwent a varicocelectomy to relieve discomfort. Exclusion criteria included history of scrotal pain due to other conditions. These include inguinal hernias, epididymitis, orchitis, STIs, UTIs, urolithiasis, prostatitis, and tumours or injuries. All 106 patients had conservative management prior to surgery, with scrotal support, non-steroidal anti-inflammatory drugs and restriction of physical activity such as heavy lifting and strenuous exercise for a minimum of three weeks (up to five weeks, mean four). But none of the individuals reported a reduction in pain. Standard tools to ligate a varicocele were the inguinal or subinguinal approach and the surgical microscope. We have included in our study the age, body mass index (BMI), varicocele grade (VMG), varicocele location (VML), testicular hypotrophy (TT), pain duration (Q), surgical method (SUT) and general health of each patient. We developed a short self-administered questionnaire to assess scrotal pain (duration and nature) and the effectiveness of treatment; see the appendix for further details. Methods Patients were grouped according to BMI (18.0, 18.0-22.9, or 23.0 kg/m$^2$) and age at operation (20, 21-29, or 30 years). Lyon et al. (2011) found that palpability of Grade I varicocele was dependent on the Valsalva manoeuvre, palpability of Grade II was independent of the Valsalva

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manoeuvre and distant palpability of Grade III was also present. We found out if the varicocele was one-sided or two-sided. The duration of pain was assessed as the sum of the months from onset to operation, which is usually about 6 months. Other criteria for the classification of patients were the difference in tumour volume (0.3 ml), the method of surgery (inguinal or subinguinal) and quality of pain (dull, dragging, throbbing, or severe). Testicular volume was assessed with a Prader orchidometer. An ipsilateral testicular hypotrophy was considered to be present when the two testicles differed in width by 0.3 ml.[12] They were divided into three groups according to the extent of pain they described: fully resolved, moderately resolved, and failed. Pain remission, full or partial, was defined as a 70% reduction in symptoms such as pain or full ablation, with no further treatment needed. Failure criteria were the presence of persistent symptoms and/or a reduction of 70%. Statistical methods of assessment Univariate general linear model analysis and multivariate linear regression were performed using SPSS for Windows, version 15.0 (SPSS Inc., Chicago, IL, USA). Statistical significance was defined as $p < 0.05$.

## RESULTS

**Table 1 patients characteristics.**

Table 1 Patient characteristics

| Characteristics | Total (n=106) |
|---|---|
| Age (years) | |
| Mean (range) | 25.7 (12–67) |
| < 20 | 34 (32.1%) |
| 20–29 | 42 (39.6%) |
| >30 | 30 (28.3%) |
| BMI (kg m –2) | |
| Mean (range) | 21.9 (16.0–27.2) |
| < 18.0 4 (7.5%) | 8 (7.5%) |

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| | |
|---|---|
| 18.0–22.9 | 62 (58.5%) |
| >23.0 | 36 (34.0%) |
| Varicocele grade | |
| I | 2 (1.9%) |
| II | 16 (15.1%) |
| III | 88 (83.0%) |
| Varicocele Location | |
| Unilateral | 96 (90.6%) |
| Bilateral | 10 (9.4%) |
| Testis volume difference (ml)a | |
| <3 | 42 (43.8) |
| >3 | 54 (56.2) |
| Quality of pain | |
| Dull | 46 (43.4%) |
| Dragging | 46 (43.4%) |
| Throbbing | 4 (3.8%) |
| Sharp | 10 (9.4%) |
| Surgical technique | |
| Inguinal | 88 (83.0%) |
| Subinguinal | 18 (17.0%) |
| Abbreviation: BMI, body mass index. a Unilateral varicocele | |

Table 2 Relationships between preoperative characteristics and postoperative improvements in pain according to univariate and multivariate analyses

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| Factors | Complete resolution (n (%)) | Partial resolution (n (%)) | Failure (n (%)) | P value | Multivariate analysis.... P value |
|---|---|---|---|---|---|
| Age (years) | | | | 0.366a | 0.762b |
| Mean (range) | | | | | |
| < 20 | 14 (41.2) | 18 (52.9) | 2 (5.9) | | |
| 20–29 | 26(61.9) | 14 (33.3) | 2 (4.8) | | |
| >30 | 16 (53.3) | 12(40) | 2 (6.7) | | |
| BMI (kg m –2) | | | | 0.243a | 0.043b |
| < 18.0 | 2 (25) | 6 (75) | 0 (0) | | |
| 18.0–22.9 | 34(54.8) | 28 (45.2) | 0 (0) | | |
| >23.0 | 20 (55.5) | 10(27.8) | 6 (16.7) | | |
| Varicocele grade | | | | 0.677a | 0.983b |
| I | 2(100) | 0 (0) | 0 (0) | | |
| II | 8 (50) | 6 (37.5) | 2(12.5) | | |
| III | 46(52.3) | 38 (43.2) | 4 (4.5) | | |
| Varicocele Location | | | | 0.716a | 0.872b |
| Unilateral | 50(52.1) | 42 (43.7) | 4 (4.2) | | |
| Bilateral | 6 (60) | 2 (20) | 2 (20) | | |
| Testis volume difference (ml)a | | | | 0.723a | 0.881b |
| <3 | 18 (42.8) | 22 (52.4) | 2(4.8) | | |

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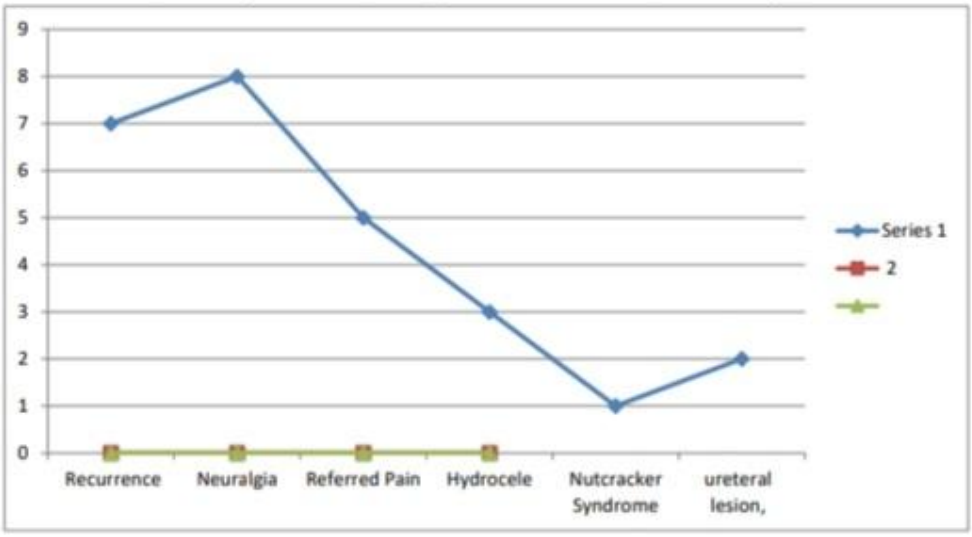
| | | | | | |
|---|---|---|---|---|---|
| >3 | 32(59.3) | 20 (37.0) | 2 (3.7) | | |
| Quality of pain | | | | 0.872a | 0.923b |
| Dull | 26 (56.5) | 18 (39.1) | 2 (4.4) | | |
| Dragging | 24(52.2) | 18 (39.1) | 4 (8.7) | | |
| Throbbing | 2 (50) | 2 (50) | 0 (0) | | |
| Sharp | 4 (40) | 6 (60) | 0 (0) | | |
| Surgical technique | | | | 0.169b | 0.169b |
| Inguinal | 48 (54.4) | 36 (40.9) | 4 (4.6) | | |
| Subinguinal | 8 (44.5) | 8 (44.5) | 2 (11.0) | | |

BMI, body mass index.
a Univariate analysis of the general linear model.
b Multivariate linear regression analysis

Table.3.Causes of persistent scrotal pain after treatment, number of patients 106



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## Discussion

Scrotal pain can cause a great deal of anxiety in sufferers. There is still no consensus on what triggers scrotal pain or varicocele. Scrotal soreness or discomfort is a common symptom for adults with varicocele. When pain is the sole symptom, we proceed with caution. However, because of the necessary changes to one's way of life, conservative treatment does have its limitations, as pointed out by Peterson et al. (1998) and Yaman et al. (2000). When less invasive treatments, such as elevating the scrotum, taking pain medication, and staying in bed, don't work, varicocelectomy is considered. Protecting the vas deferens, lymph vessels, and spermatic cord arteries, a varcocelectomy ligates all internal branches of the spermatic vein to facilitate testicular venous drainage (Goldstein, 2002). The varicocele can be treated with laparoscopic surgery, radiologic treatments (such as sclerotherapy or embolisation), or open surgery (inguinal, high retroperitoneal, subinguinal, or scrotal). Microscopic methods had the fewest problems and recurrence rates, according to research by Goldstein et al. (1992).This led us to employ a subinguinal technique for microdissection in each and every patient. These days, varicocelectomy is reserved for very rare instances. Imaging can reveal asymptomatic varicoceles, so there's no need to treat them. According to Schlesinger et al. (1994), a varicocelectomy should be considered when infertility, abnormal semen values, and a palpable varicocele are present. Schlesinger et al., who analysed 12 research, found that varicocelectomy reduced sperm mobility. Although five of the seven studies looked at the effects of the technique on sperm motility, the other two found no change (Lund & Larsen, 1998). Both patients with and without varicocele were re-evaluated by Lund and Larsen eight years following the end of treatment. The control group's sperm count dropped noticeably, while the varicocele group showed no change.In terms of sperm motility, Yeniyol et al. (2003) found no statistically significant difference between the two groups. We found that the sperm count of patients who had pain-relieving procedures increased. Sperm motility was also found to

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have improved in this study. The Lund and Larsen study found that infertility was a subsequent complication in patients whose primary motivation for surgery was pain relief rather than infertility itself. Considering this, we still think varicocele surgery is necessary for people whose only symptom is pain, as it can prevent additional issues. Infertility is the main focus of varicocele research. There has been a dearth of studies examining the possibility of varicocele-related pain. According to the research, the success rate for treating scrotal pain after varicocelectomy ranges from 73% to 86%, whereas 3% to 17% experience partial response and 7% to 11% experience nonresponding discomfort. Based on our findings, 79.2% of the trials were successful, while 20.8% were unsuccessful (including those with partial failures). Following the procedure, the patient noticed a marked improvement in their pain. A correlation between pre-operative varicocele grade and failure rate was found by Yaman et al. (2000). Multiple authors have found that post-operative success rates are correlated with factors such as surgical complications, epididymitis, pain characteristics, and the length and nature of the pain.(Al-Buheissi et al., 2007; Yaman et al., 2000; Altunoluk et al., 2010; Chawla et al., 2005; Peterson et al., 1998). Patients whose therapies were unsuccessful did not exhibit recurrent reflux. Hydrocele developed in one patient throughout our examination. On the other hand, he was among those who did not feel any discomfort following the operation. While it failed to ascertain the duration of pain prior to surgery, it did find no statistically significant variation in varicocele grade, severity, or quality between the two groups after the procedure. While some changes in the anatomy of the spermatic veins may cause discomfort, others may have unknown effects on the nerves. Results from histological examinations of spermatic veins from patients with varicocele could not be used to make definitive findings. In instances of varicocele and scrotal pain, histological and immunohistochemical examination of spermatic veins can provide new insights into the situation at hand.Though a few

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| Causes of persistent scrotal pain after treatment: | number of patients 106 % |
|---|---|
| 1.Recurrence | 6–8 % |
| 2. Neuralgia | 5–10% |
| 3.Referred Pain | 5–6% |
| 4.. Hydrocele | 2–3% |
| 5. Nutcracker Syndrome | 1% |
| 6.ureteral lesion, | 1–2% |
| 7. unknown | 4–5% |

Certain surgical procedures have been found to have a higher failure rate in certain studies, whereas no such difference has been found in others. sum of 3, 7, and thirteen One study indicated a statistically significant difference between the two groups, suggesting that cremasteric muscle ischaemia could play a substantial role in varicocele pain; however, there is limited evidence regarding the effectiveness of external spermatic vein ligation in reducing postoperative complications. Unfortunately, this idea is not backed up by any evidence in the published literature. We did not find any association between surgical success rates and inguinal or subinguinal procedures, despite our best efforts. Nine people actually underwent a subinguinal procedure, which is somewhat surprising. Because of this, we need further studies to determine how surgery affects pain relief. We did not detect any recurrence or long-lasting varicocele in the patients whose pain did not go away, according to Yaman et al.6 and Altunoluk et al.9. It is commonly believed that the probability of varicocele recurrence is unrelated to pain endurance. Regarding this inquiry, there are a number of important caveats

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that need to be mentioned. The lack of a randomised study and the small sample size are the primary issues.An uneven distribution of patients in terms of grade, varicocele site, and surgical method (subinguinal versus inguinal) may have also contributed to bias. Varicocele ligation, when other pain treatments have failed, is clearly a beneficial alternative for some people. Beyond that, there was a strong correlation between a shorter length of pain before surgery and a marked improvement in symptoms.

**Conclusions and recommendation**

The purpose of this research is to determine what factors affect surgical pain treatment outcomes and to compare the success rates of various methods. Persistent scrotal pain may be caused by varicoceles for two possible reasons. The lack of standardised databases and systematic techniques to scrutinise data and acquire research relevant to varicocele may be seen as a shortcoming of this paper. The reviewed articles may have overlooked some potential causes of scrotal discomfort after surgery. The article fails to mention how varicoceles develop. Depending on the patient's unique situation, the surgical method used to treat varicocele can reduce pain and enhance fertility. Considering the known factors that impact surgical results is crucial when choosing a treatment for postoperative pain. Finding the source of the pain and developing a remedy requires a thorough assessment. It is crucial that there be minimal risk of recurrence or complications following varicocelectomy because persistent pain could be an indication of issues. To back up these findings, we need a large-scale prospective randomised trial that uses random assignment and has a long follow-up period.

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