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Thrombosis of the Left Pampiniform Plexus After Scleroembolization Procedure for Varicocele

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Abstract: *Thrombosis of the pampiniform venous plexus is a very rare pathology, mainly affecting the left spermatic vein and is one of the causes of acute scrotal pain. It presents with initial symptoms, such as pain and testicular swelling, which may be nonspecific for thrombotic disease and they may simulate other acute local conditions. Color Doppler Ultrasound is the main examination for diagnosis. For the few cases available in the literature, the etiology and pathophysiology of spermatic vein thrombosis remain unclear and, for the same reason, the differential diagnosis and the therapeutic approach, conservative vs surgical, still raise numerous controversies. In this work, the Authors report a very particular case of left pampiniform plexus venous thrombosis that occurred in a young patient a few hours after the scleroembolization procedure for the minimally invasive treatment of varicocele.*

Key words: thrombosis, pampiniform plexus, testicular acute pain.

INTRODUCTION

Clinical Case

A 17 year old patient, with a silent remote medical history, was a candidate for treatment of left varicocele, with Dubin Amelar classes of third degree and Sarteski in Valsalva of fourth degree, compared with the ultrasound classification system, through an endovascular technique of retrograde percutaneous embolization performed as a rule: ultrasound-guided access on the right common femoral vein, introduction of the angiographic catheter up to selective catheterization of the left internal spermatic vein, angiography with contrast medium and subsequent injection of quantities of sclerosing substances and spirals according to a dedicated technique in its phases. Six hours after the scleroembolization procedure, the patient had acute pain worsening in the left testicle with ipsilateral scrotal swelling. On Color Doppler Ultrasound examination the testicle was enlarged and inhomogeneous, the spermatic cord was tortuous and inhomogeneous with no blood

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flow and thrombosis of the spermatic vein, the head of the epididymis was not detectable by ultrasound and there was an absence of the cremasteric reflex (**Figure 1**).

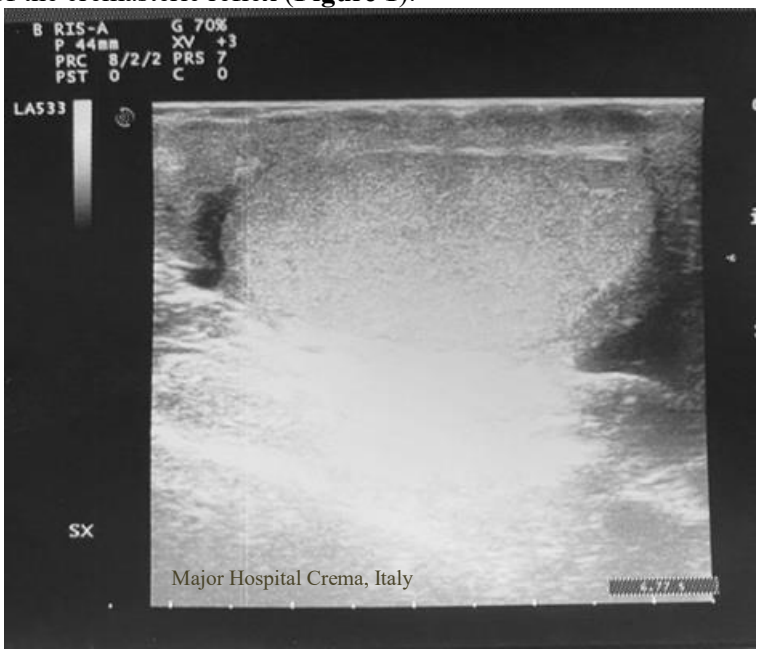

Figure 1. Pathological state of the testicle on Color Doppler Ultrasound.

The patient then underwent emergency surgical exploration with subsequent detection of massive chemical thrombosis of the left spermatic cord (**Figure 2**).

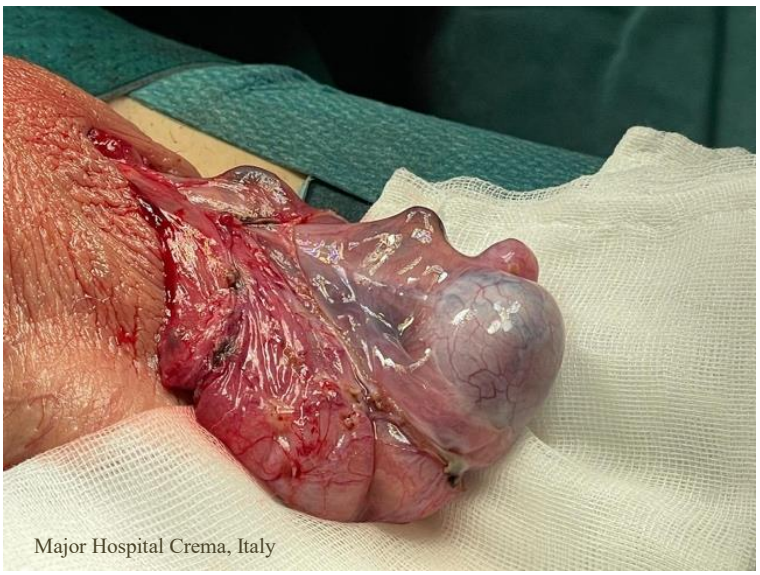

Figure 2. Massive chemical thrombosis of the left spermatic cord.

In particular, a transverse incision of the left hemiscrotum was performed, the Dartos band was opened and the testicle was displaced from the scrotal sac. After opening the tunica vaginalis, the spermatic cord appeared partially twisted, swollen and edematous, with an extensive thrombus visible in the dilated pampiniform venous plexus; the testicle was in an orthotopic position but had a cyanotic coloration. The spermatic cord and

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testicle were freed from adhesions and aligned on the axial plane. After 15 minutes of 'immersion' in warm saline, the coloration and consistency of the testicle improved significantly. The testicular appendix or Hydatid of Morgagni, the excess tunica vaginalis and the spermatic cord edema were also removed. Color Doppler evaluation demonstrated adequate left testicular blood flow. The testicle was then repositioned into the scrotal pouch and fixed, while the hemiscrotal incision was closed in layers with absorbable sutures. The subsequent postoperative course was regular and free of complications. The patient took low molecular weight heparin therapy for about 6 weeks and was subsequently kept under biweekly clinical control for about 2 months, with a visit and ultrasound examination, with complete restoration of testicular flow.

DISCUSSION

Thrombosis of the pampiniform venous plexus is extremely rare and was first described by McGavin in 1935[1]. It mainly affects the left spermatic vein and is one of the causes of acute scrotal pain. In this regard, it is in differential diagnosis with other clinical conditions, sometimes confused with other pathologies due to the lack of specific clinical features. In fact, the presenting symptoms such as pain and testicular swelling, sometimes with a palpable mass, usually localized on the left side, may be nonspecific for thrombotic pathology or simulate other conditions such as testicular torsion, orchi-epididymitis or complicated inguinal-femoral hernia[2].

Due to its rarity, the etiology and pathophysiology of this condition of thrombosis, with clot formation, remain unclear. Some Authors link this condition to local pathological changes such as varicocele or obstruction of venous drainage (as in tumors, trauma or prolonged sexual activity), to vascular endothelial damage, to the use of corticosteroid drugs, as well as due to coagulopathies, to laparoscopic surgery for inguinal hernia or to undiagnosed systemic diseases. In fact, the anatomical conditions involving compression of the left renal vein between the superior mesenteric artery and the abdominal aorta, known as 'Nutcracker Syndrome', with increased pressure and pathological reflux to the testicle, together with the poor representation of the valves at the level of the left spermatic vein, could explain why varicocele more frequently develops on the left side. Furthermore, the anatomical peculiarities on the left, where the gonadal vein flows into the renal vein at a perpendicular angle of 90°, as well as the increase in pressure caused by the position of the left renal vein when it joins the vena cava (about 10 cm above the right renal vein), favor reflux and therefore an increase in the risk of varicocele[3,4].

The imaging modality of choice in the diagnosis of thrombosis of the pampiniform venous plexus is represented by Color Doppler Ultrasound, where the characteristic appearance of the thrombus is a hypoechoic mass that is non-compressible and devoid of flow[5]. In selected cases, such as in the case of difficult differential diagnosis, Computed Tomography can be used which, in the specific case, allows for a more accurate visualization and extension of the thrombus[6].

As a premise to the reported clinical case, spermatic scleroembolization performed for the treatment of varicocele (minimally invasive interventional radiology procedure that aims to selectively and in a controlled manner 'closing' the spermatic vein, or the dilated pathological ones, with sclerosing substances or with microspirals), has the purpose of blocking the anomalous venous reflux, eliminating the venous stagnation that damages the testicular function, or rather restoring a correct venous return without compromising the blood flow. In fact, it does not interrupt the overall vascularization of the testicle because this is guaranteed by other vessels and allows for faster recovery times for the patient. The resulting massive chemical thrombosis of the pampiniform plexus, a complication of spermatic scleroembolization in our clinical case, was a very rare event but documented in the literature[7,8]. In fact, a sclerosing substance can condition the local formation of thrombosis and can be one of the side effects associated with this substance, mostly for the foaming form.

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Currently, there is no standard treatment for spermatic thrombosis as there is still no clear consensus on the management of cases conservatively or surgically. In general, the decision is therefore 'delegated' to clinical and instrumental evaluation with Color Doppler Ultrasound, or with complementary Computed Tomography, if the situation allows it. In the case of venous thrombosis, management will depend on different variables such as severity, extension and symptomatology[9].
The conservative approach is based on different aspects such as serial clinical and ultrasound monitoring to control the residual venous flow, the evolution and extension of the thrombosis, also evaluating the contralateral testicle to exclude congestion or altered compensation, rest and scrotal elevation, the use of anti-inflammatory drugs for pain, the use of antibiotics in case of infection from septic phlebitis (fever, intense pain, marked scrotal redness and leukocytosis) and the use of anticoagulant drugs in selected cases. In this regard, this last therapy is undertaken to avoid thrombotic extension, in the course of extensive venous involvement in the deep circulation with risk, although rare, of embolism, in relapses or in patients with a positive history of thrombophilia[10].

In the case of severe, persistent and worsening pain, with a marked increase in the scrotum or acute testicular suffering, such as the absence of hypoechogenicity or altered testicular perfusion on Color Doppler, as in the suspicion of complicated massive thrombosis with risk of testicular compromise, even in the presence of fever or systemic signs, we agree with some Authors that exploratory surgery is indicated in an attempt to preserve the testicle and fertility. In the case of testicular suffering from thrombosis, an intraoperative procedure for evaluating the reversibility of testicular damage, in selected cases, is represented by 'immersion' of the testicle, wrapped in sterile gauze, in sterile heated physiological solution for approximately 15 minutes with the aim of stimulating vasodilation, evaluating the recovery of color, perfusion and consistency of the testicle, in order to try to recover a suffering testicle avoiding its removal (conservative salvage). The recovery of color and consistency, from cyanotic to pink, and the improvement of arterial flow, detectable both with palpation of the pulse and with intraoperative Color Doppler Ultrasound, can avoid more aggressive surgical maneuvers[11,12].

CONCLUSION

In general, thrombosis of the spermatic vein is a rare disease with few characteristic clinical signs, whose differential diagnosis and treatment raise numerous controversies. Clinically, pain and swelling in the testicular area are the most frequent but nonspecific symptoms. Color Doppler Ultrasound has a high sensitivity and specificity and usually represents the gold standard for diagnostic orientation. In the reported clinical case, the instrumental finding of testicular swelling and interruption of spermatic blood flow influenced the choice of emergency exploratory surgery, especially due to the presence of a clinical condition of acute scrotum.
In this regard, percutaneous embolization for varicocele, despite being a safe procedure that offers some advantages over surgery, may however involve the risk, even if minimal, of technical failure and serious complications such as thrombosis of the pampiniform venous plexus, as well as vascular perforation or migration of the coils.

In this work, an even rarer case of thrombosis of the left spermatic vein by post-embolization for the treatment of a varicocele has been described. We hypothesize that it is very likely that the minimally invasive procedure of scleroembolization has created endothelial damage to the treated spermatic venous vessels, damage that would have further predisposed to an alteration of the blood flow.

Finally, the possibility of this type of pathology occurring should influence the clinician to always take it into consideration during the differential diagnosis phase. As reported in the literature, the topic is still controversial

and there is still no clear consensus on the therapeutic approach, conservative or surgical, by virtue of the few published cases.

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Declaration

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Authors' Contribution

ZW and **DPS** and **SGN**: Planned work, conducted the literature search and produced the report.

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VG and **SA**: Helped in contributed to produce the report.
ZW and **SGN**: Final revision before delivery.
All authors have reviewed the final report and approve its publication.

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Ethical considerations
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