



Unilateral right-sided varicocele associated with pancreatic cancer: A cadaveric case report



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ABSTRACT

A testicular varicocele is an abnormal dilation of the pampiniform plexus of veins within the spermatic cord. Due to the asymmetrical drainage pattern of the right and left testicular veins, the vast majority of varicoceles are found on the left side. Isolated right testicular varicoceles occur rarely and should raise clinical suspicion for underlying intra-abdominal pathology. During the dissection of a 67-year-old male cadaver a unilateral varicocele was discovered in the right spermatic cord. Upon dissection of the abdomen, a tumor was found in the head and body of the pancreas. The section of the inferior vena cava where the right testicular vein inserted laid directly posterior to the tumor and was markedly dilated. We hypothesize that this pancreatic tumor impeded venous return into the inferior vena cava from the right testicular vein and not the left renal vein (where the left testicular vein drains) resulting in a unilateral right varicocele (URV). To our knowledge, the relationship between URV and pancreatic cancer has not been previously described in the literature. Our findings suggest URV could be a clinical warning sign of cancer of the head and/or body of the pancreas and may be a source of discomfort to address in patients with pancreatic cancer in order to improve quality of life.

1. Introduction

In males, venous drainage from the testicles and spermatic cords first passes through a convoluted network of veins known as the pampiniform plexus. Inside of the abdomen, these veins eventually coalesce and drain into the right and left testicular veins which drain blood into the inferior vena cava (IVC) and left renal vein, respectively. Retrograde flow of blood through the testicular veins causes an abnormal dilation of the pampiniform plexus known clinically as a varicocele. Although generally asymptomatic, varicoceles are a common cause of male infertility and can present with decreased testosterone levels, testicular atrophy, and testicular discomfort or pain [1,2]. Varicoceles are diagnosed clinically, often described as a “bag-of-worms” upon palpation, or with Doppler ultrasonography [3,4]. It is a common condition, affecting nearly 15% of the general male population [5,6]. Varicoceles have been shown to increase in prevalence with advanced age, with a 10% increase for each decade of life [7,8]. The vast majority occur on the left side, although there is wide variation among the reported prevalence of bilateral varicoceles, ranging from 10% to 80% [4,9]. Isolated varicoceles occur on the right side only in rare cases. Recent studies have demonstrated the presence of unilateral right-sided varicoceles (URVs) in only 1.5%–3% of affected patients [4,10].

This left-sided predisposition can be explained anatomically by the asymmetric drainage pattern of the testicular veins. The left testicular vein (LTV) ascends the pelvis vertically and drains into the left renal vein perpendicularly, whereas the right testicular vein (RTV) travels tangentially to insert into the IVC at a more oblique angle. Additionally, the LTV is 8–10 cm longer than the right, which acts as a longer hydrostatic column causing increased pressure [11]. Therefore, blood in the LTV encounters higher resistance and is more likely to backflow into the pampiniform plexus of veins [12,13]. As such, an isolated right testicular varicocele should prompt further investigation as it may be associated with variant anatomy or intra-abdominal pathology such as a retroperitoneal mass [5,12,14,15]. In this cadaveric case report, we present a potential association between URV and pancreatic cancer, which could have important diagnostic and clinical implications.

2. Material and methods

A formalin fixed cadaver was dissected over a 4-month period by third year osteopathic medical students as a part of the Pre-doctoral Anatomy Fellowship at Rocky Vista University College of Osteopathic Medicine.

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Fig. 1. Right testicle and spermatic cord. Marked dilation of the pampiniform plexus of veins (arrow) is known clinically as a varicocele.



Fig. 2. Left testicle and spermatic cord. The pampiniform plexus of veins (arrow) is of normal caliber.

3. Results

During the dissection of a 67-year-old Caucasian male cadaver with a known cause-of-death of pancreatic cancer, a varicocele was discovered in the right spermatic cord. Upon dissection of the spermatic cord, the right pampiniform plexus of veins was markedly dilated to 4.4 cm in circumference (Fig. 1) compared to 3.4 cm on left side (Fig. 2). The right testis was smaller with a circumference of 8 cm vs. 8.6 cm on the left, which could likely be due to atrophy. The testicular veins were also found to be different lengths with the right measuring 35.9 cm and the left measuring 42.9 cm. Upon dissection of the abdomen, a 9×5 cm tumor was found in the head and body of the pancreas (Fig. 3). It had invaded into the wall of the duodenum as well as the gastroduodenal artery. The section of the IVC directly posterior to the location of the tumor was dilated to 4.7 cm, whereas the non-dilated section of the IVC located below the insertion of the RTV measured 2.8 cm (Fig. 4).

4. Discussion

Pancreatic cancer, which is more common in men, is the fourth leading cause of cancer-related death despite being the 12th most common cancer overall [16]. With a 5-year survival rate of only 7.2%, pancreatic cancer is one of the most lethal malignancies [17]. Many patients are asymptomatic at the time of diagnosis, and clinical symptoms such as pain, jaundice, and weight loss tend to be non-specific [18]. As such, pancreatic tumors have a median size of 3.1 cm at diagnosis – too large for resection as the surgical guideline is < 2.0 cm in



Fig. 3. Cross section through the body of the pancreas (BP) and pancreatic tumor (*). There is invasion into the wall of the duodenum (D). Note the self-expanding metal stent (SEMS) in the common bile duct.

diameter without distant metastases [19]. In fact, less than 15% of patients are diagnosed with a resectable tumor [19]. Additionally, there are no routine screening tests or reliable biomarkers to aid in early diagnosis [20]. Because surgical resection represents the only chance for remission, lack of early detection of the malignancy is a great contributor to its lethality [18].

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