

Portal Vein Thrombosis after Splenectomy

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ABSTRACT:

Background and Aim of the work: Splenectomy is a common operation but it carries the danger of many postoperative complications. One of the most important complications is the portal vein thrombosis (PVT), which may be fatal due to development of bowel ischemia and severe portal hypertension. Due to the effect of hypobaric hypoxia and higher liability for thrombosis encountered in high altitude areas, PVT may represent an actual problem in Taif province. The aim of this retrospective study is to detect the incidence, pattern of presentation, laboratory, radiological and results of treatment of cases of PVT following splenectomy.

Methods: In this study, we reviewed all cases of splenectomy performed in King Abdul Aziz Specialist Hospital, Taif, Saudi Arabia from January 2007 to January 2012. Cases of PVT following splenectomy were analyzed for incidence, pattern of presentation, laboratory, radiological and results of treatment.

Results: This study involved 50 patients (40 males and 10 females) admitted in the surgical department of King Abdul Aziz Specialist Hospital, Taif, Saudi Arabia from January 2007 to January 2012. Eight cases of Portal vein thrombosis (16%) out of 50 splenectomies were identified. These 8 patients included: 4/10 of the patients (40%) suffering from myeloproliferative (MP), 3 of them (75%) had spleen weight greater than 3,000 g, 3/12 (25%) of the hemolytic anemia patients, and 1/10 of the patients (10%) operated upon for Hypersplenism. All patients had splenomegaly with mean weight of 1540 Gms (range 460 to 3850 g). Presenting symptoms included; anorexia in 7/8 cases (87.5%), abdominal pain in 6 (75%), and in all cases there was elevation in D-Dimer level, leukocyte and platelet counts. All diagnoses were made by contrast-enhanced computed tomography scan, and anticoagulation was initiated immediately. One/8 patients (12.5%) died from progressive liver cell failure; the others are alive with no clinical sequelae at a mean follow up of 27 months.

CONCLUSIONS: PVT is a relatively common complication of splenectomy in patients with Splenomegaly, especially in Taif and related districts in which there is already a higher incidence of thrombotic disorders. The surgeon has to be with high index of suspicion, for early diagnosis by contrast-enhanced computed tomography, and prompt anticoagulation for successful outcome.

Keywords: portal vein, splenectomy, thrombosis.

INTRODUCTION

Portal vein thrombosis (PVT) is a rare but serious complication of splenectomy, however, this low incidence may be related to underestimation of the problem because symptoms, such as abdominal pain and fever are non-specific and portal vein thrombosis can easily develop without any symptoms (Winslow et al, 2005). Hypercoagulability after splenectomy and stasis of the blood in the stump of splenic vein appear to predispose to splenic/portal vein thrombosis (SPVT), this hypercoagulability may be due to increased viscosity secondary to high platelet and leucocytes' count as a result of absent splenic breakdown (Stamou et al, 2006). Splenectomy is associated also with increased rigidity of erythrocytes possibly caused by accumulation of nuclear remnants (Howell Jolly bodies) which contributes to a high plasma viscosity (Phillipe et al, 1998). The magnitude of this problem may be exaggerated in high altitude environment (like in Taif province) due to the effect of hypobaric hypoxia on coagulation system (Bendz et al, 2000, Mubarak et al, 2012 and Al Saeed et al, 2012). Identification of patients with portal vein thrombosis is challenging to allow early treatment and prevent potentially fatal complications such as bowel infarction or later portal hypertension (Dominique and Bertrand 2000). The aim of this retrospective study is to detect the incidence, pattern of

presentation, laboratory, radiological and results of treatment of cases of PVT following splenectomy.

PATIENTS AND METHODS: In this retrospective study, we reviewed the hospital records of all patients who had splenectomy performed in King Abdul Aziz Specialist Hospital, Taif, Saudi Arabia from January 2007 to January 2012. The study included 50 patients and we reviewed the patient files for; age, gender, pattern of presentation, laboratory, radiological, results of treatment and follow up data if available of the patients included in the study.

Results: This study involved 50 patients with mean age of 36 years (range 9-64) and it included forty males and ten females (table 1), admitted in the surgical department of King Abdul Aziz Specialist Hospital, Taif, Saudi Arabia from January 2007 to January 2012. Eight cases of Portal vein thrombosis out of 50 splenectomies (16%) were identified. The incidence of post-splenectomy portal vein thrombosis varies according to the indications of splenectomy (table 2) where among the 8 patients with PVT included in the study, there were; 4 of the 10 patients (40%) underwent splenectomy and were suffering from myeloproliferative (MP) disease, 3/12 (25%) of the patients with hemolytic anemia, and 1/10 patients (10%) operated upon for Hypersplenism. Five/50 patients (10%) developed PVT despite

receiving prophylactic subcutaneous heparin postoperatively. All patients had splenomegaly with mean weight of 1540 Gms (range 460 to 3850 g). Three of 4 patients (75%) with MP disease and spleen weight greater than 3,000 g developed PVT. Diagnostic findings are summarized in table 3; presenting symptoms included anorexia in 7/8 cases (87.5%), vague abdominal pain in 6 (75%), fever in 5/8 patients (62.5%), nausea and vomiting in 4/8 patients (50%) and dyspepsia in 3/8 patients (37.5%). Thrombocytosis was marked in all patients who developed portal vein thrombosis where platelet count ranged from 780,000-1,060,000/ml (mean 813,000), while in patients did not

developed PVT, it ranged from 290,000-690,000/ml (mean 480,000). Leukocyte count was high in all patient with mean of 14,600/c mm. Hemoglobin was high in 3/8 patients (37.5%), normal in 2/8 patients (25%) and low in 3 patients (37.5%) and the mean hemoglobin level was 14.5 gm/100 ml. D-Dimer level was high in all patients (higher than 3 µg fibrinogen equivalent units/mL). All diagnoses were made by contrast-enhanced computed tomography (CT) scan, and anticoagulation was initiated immediately. One/8 patients (12.5%) died from progressive liver cell failure; the others are alive with no clinical sequelae at a mean follow up of 27 months.

Table 1: Demographic data.

Gender	Number of patients (%)
Male	40/50 (80)
Female	10/50 (20)
Age	years
Mean	36

Table 2: Portal vein thrombosis versus the indications of splenectomy

Indication of splenectomy	PVT (%)
Total number of PVT	8/50 (16)
Myeloproliferative disease	4/10 (40)
Hemolytic anemia	3/12 (25)
Hypersplenism	1/10 (10)

Table 3: Diagnosis

Finding	Number of patients (%)
Anorexia	7/8 (87.5)
Abdominal pain	6/8 (75),
Fever	5/8 (62.5),
Nausea & vomiting	4/8 (50)
Dyspepsia	3/8 (37.5)
Laboratory tests:	
Thrombocytosis (mean 813,000)	8/8(100)
Leukocytosis (mean 14,600/c mm)	8/8(100)
Hemoglobin (mean 14.5 gm/100 ml):	
High	3/8 (37.5)
Normal	2/8 (25)
Low	3/8 (37.5)
D-Dimer level (> 3 µg fibrinogen equivalent units/mL)	8/8(100)
Diagnostic CT (contrast-enhanced)	8/8(100)

DISCUSSION:

The incidence of asymptomatic splenic/portal vein thrombosis (SPVT) is not uncommon after splenectomy and it is usually underestimated due to methodological variations and varying degrees of clinical awareness of this complication in contrast to DVT/PE, where the evaluation of postoperative thrombosis has become highly standardized, however, this is not the case with SPVT(Winslow et al, 2005). The definition of risk factors of thrombo-embolism is important for the choice of intensity and duration of postoperative antithrombotic prophylaxis, generally,

three groups of risk factors have to be considered; first is the preoperative clinical or laboratory risk factors, such as age, obesity, previous thrombosis; second, the underlying disease (in particular malignant disease); and the last are the factors related to the surgical intervention itself including duration, open or laparoscopic surgery (Tenconi et al, 2010). All these factors are also risk factors for SPVT, but in the case of splenectomy the type of the underlying disease and the spleen size seem to be by far the highest risk factor as seen in the patients with big spleens, suffering from myeloproliferative

(MP) diseases, lymphoma and patients with hemolysis, in particular hereditary hemolytic anemia (Mohren et al,2004). Petit et al, (1994) in a prospective study with the use of US and CT, found that 13 cases (10.9%) complicated by SPVT after splenectomy. In the present study we found that the incidence of PVT after splenectomy was significantly higher than that of other studies, 8/50 patients (16%), this higher incidence may be attributed to the high incidence of splenectomy in blood diseases and may be related to environmental factors where high altitude may play an important role due to the effect of hypobaric hypoxia on coagulation system and in particular, increased factor VIIa activity, in addition to dehydration, polycythemia and vascular spasms may lead to a higher liability for thrombosis (Bendz et al, 2000, Mubarak et al, 2012 and Al Saeed et al, 2012). Blood diseases represent the main indication of splenectomy in many studies, Phillipe et al, (1998) reported that most of the cases of PVT after splenectomy were due to blood diseases with considerable percentage in females. Similar results were reported by Chaffanjon et al, (1998), in their study of 60 patients who had splenectomy for hematological diseases they found that 3 (5%) developed asymptomatic PVT. In our study 4/10 patients (40%) who had myeloproliferative (MP) disease developed PVT (3 of them (75%) had spleen weight greater than 3,000 g) PVT is also seen in 3/12 (25%)

with hemolytic anemia, and in 1/10 patients (10%) operated upon for hypersplenism.

It has been stated that the same rules for postoperative thrombosis prophylaxis should be applied for Splenectomy, but, most of the studies concentrated on the risk of postoperative DVT/PE and did not consider the risk of SPVT though the incidence of asymptomatic SPVT seems to be significantly higher than that of DVT/PE (Stamou et al, 2006). Several cases of SPVT have been described in patients despite prophylaxis with standard or low molecular weight heparin (Geerts et al, 2004). This study showed that 5/50 patients (10%) developed PVT despite receiving prophylactic subcutaneous heparin postoperatively and represented 62.5% (5/8) of all patients developed this complication; however, this may be related to short duration of therapy. In this series vague abdominal pain was the most common symptom of patients followed by fever, nausea and vomiting in addition to that Leukocytosis was present in all patients. These data are vague and non specific but comparable to that reported in other studies (Winslow et al, 2005). Secondary polycythemia was seen in 37.5% of patients (3/8) and the mean hemoglobin level was 14.5 gm/100 ml, however, these cases of polycythemia must be put in consideration especially in patients living in high altitude environment. Thrombocytosis was marked in all patients who developed portal vein

thrombosis where platelet count ranged from 780,000-1,060,000/ ml (mean 813,000), while in patients did not developed PVT, it ranged from 290,000-690,000 / ml (mean 480,000). Mesa et al, (2006) concluded that following splenectomy; thrombocytosis is one of the most important predisposing factors for S/PTV and he advised antithrombotic prophylaxis if the platelet count exceeds one million and even if less in presence of other risk factor(s). In the present study, D-Dimer level was high in all patients (higher than 3 µg fibrinogen equivalent units/mL), however, several studies have shown that D-Dimer assay would have a high negative predictive value, and this test may be useful for the exclusion of patients with suspected mesenteric/portal vein thrombosis (Altinyollar et al, 2006 and Yu Zhang et al, 2012).

In most of the studies color duplex imaging was the screening method of choice, but it is now well known that contrast enhanced CT is more sensitive and In fact, the incidence of SPVT was at least twice as high when contrast enhanced CT was used for screening or diagnosis (Bradbury, et al 2002). In this study all cases of PVT were confirmed by contrast enhanced CT after performing initial color duplex whilst, routine Ultrasonography was often of restricted value due to bowel distension in the early postoperative days so, no accurate diagnosis could be achieved.

After diagnosis of portal vein thrombosis, prompt initiation of therapy seems to be an important determinant for success and different regimen of treatment was used (Dominique and Bertrand 2000). In the present study anticoagulation was initiated immediately with good response and 7/8 patients (87.5%) responded with complete or partial recanalization at a mean follow up of 27 months. one/8 patients (12.5%) died from progressive liver cell failure. These findings are coincident with that of other studies where recanalization can be achieved with anticoagulant therapy in more than 80% of patients (Riet et al., 2000).

CONCLUSIONS: PVT is a relatively common complication of splenectomy in patients with Splenomegaly especially in Taif and related districts in which there is already a higher incidence of thrombotic disorders. The surgeon has to be with high index of suspicion, for early diagnosis by contrast-enhanced computed tomography, and prompt anticoagulation for successful outcome.

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الملخص العربي

جلطة الوريد البابي بعد استئصال الطحال

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مقدمة والهدف من البحث: إن استئصال الطحال من العمليات الشائعة والتي كثيرا ما تعد الحل الأمثل لمعظم أمراض وأصابات الطحال وقد ينتج عن هذه العملية العديد من المضاعفات والتي من أخطرها جلطة الوريد البابي والتي قد تمثل خطرا على حياة المريض حيث ينتج عنها ارتفاع الضغط في الدورة البابية وقد تؤدي إلى احتشاء الأمعاء في بعض الحالات وكان الهدف من هذه الدراسة تقييم حالات جلطة الوريد البابي بعد استئصال الطحال من حيث نسبة حدوث المرض وطرق تشخيصه وعلاجه.

المرضى والاساليب: وقد شملت هذه الدراسة خمسين مريضا (أربعين من الذكور وعشرة من الاناث) حيث تم فحص ملفات المرضى الذين تم إجراء لهم جراحه لاستئصال الطحال بقسم الجراحة العامة بمستشفى الملك عبد العزيز بالطائف في الفترة ما بين يناير 2007 إلى يناير 2012 من حيث نسبة حدوث المرض وطرق تشخيصه وعلاجه.

النتائج: وكانت نتيجة هذه الدراسة اكتشاف 8 مرضى (16%) مصابين بجلطة الوريد البابي بعد استئصال الطحال وتعد هذه النسبة عالية وترجع إلى عدة عوامل اهمها الحالات التي وجد بها تضخم واضح في الطحال وبخاصة المصاب لأمراض الدم او زيادة عدد الصفائح الدموية بعد استئصال الطحال بالاضافة الى العوامل البيئية في المناطق المرتفعة.

وقد وجد أن حالات جلطة الوريد البابي تعاني من ارتفاع في درجة الحرارة وآلام بالبطن، عسر الهضم وأحيانا ميل للقيء وبفحص كل المرضى بواسطة جهاز الدوبلر الملون والأشعة المقطعية مع استخدام الصبغة وجد أن 8 مرضى بهم جلطة في الوريد البابي و قد تم علاج هؤلاء المرضى بمجرد تشخيص الجلطة دون انتظار حيث أن العلاج يعطي نتائج جيدة ويجنب المريض خطورة تلك الجلطة.

خاتمة: ان جلطة الوريد البابي مرض شائع نسبيا بعد استئصال الطحال في المرضى الذين يعانون من تضخم الطحال وخصوصا في الطائف والمناطق حولها ويجب على الجراح ان يكون منتبها لتشخيص المرض في وقت مبكر بواسطة التصوير المقطعي مع الصبغة واعطاء موانع تخثر الدم فورا ليحصل على نتيجة مرضية.