Brazilian Journal of Videoendoscopic Surgery

Original Article

Comparative Study of Patients that Underwent Splenectomy for Immune Thrombocytopenic Purpura With and Without Splenic Artery Embolization

PLÍNIO CARLOS BAÚ[1]; BERNARDO GARICOCHEA[2]; CRISTINA GÓES SCHAURICH[3]; DANIEL GEHLEN[4]; RENATA BAÚ[5]

[1] Associate Professor, MD, PhD, School of Medicine, Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS), Porto Alegre, Brazil; [2] Associate Professor, MD, PhD, School of Medicine, Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS), Porto Alegre, Brazil; [3] Doctoral Student of School of Medicine of PUCRS; [4] Doctoral Student of School of Medicine of PUCRS; [5] Medical Student.

ABSTRACT

Basis and Objectives: Platelets and/or red blood cells transfusion usually are performed in patients with Immune Thrombocytopenic Purpura (ITP) who are submitted to splenectomy. The purpose of this study is to test if preoperative embolization of splenic artery is able to prevent platelets and/or red blood cells transfusion. Patients and Methods: All patients submitted to splenectomy for purpura between October 1999 and April 2008 by the same surgical team were enrolled in the study. The first 18 patients were not submitted to embolization and were compared to the follow 11 consecutive patients in whom embolization was performed. Results: The platelets count in the group who embolization was performed rose from average 7000 u/µl before the procedure to 75000 u/µl after the procedure. Platelets and red blood cells transfusion was not necessary in the group submitted to embolization compare to the group without preoperative embolization, 12 patients with platelets transfusion (p=0,001) and 9 patients with red blood cells transfusion (p=0,01). In this study platelets and red blood cells were not transfused in patients submitted to embolization of splenic artery before splenectomy. Conclusion: Our results seem to confirm the advantages of preoperative embolization of the splenic artery for patients that underwent splenectomy for ITP when compared to patients without embolization. The data obtained in this study demonstrated that embolization consists of a safe and effective procedure to prevent transoperative bleeding and the necessity of hemoderivates.

Key words: Therapeutic Embolization; Splenectomy; Purpura, Thrombocytopenic.

Bras. J. Video-Sur, 2008, v. 1, n. 1: 003-006

Accepted after revision: January, 15, 2008.

INTRODUCTION

The first splenectomy was performed in 1549 in Naples by Adrian Zacarelli[1] for splenomegaly probably caused by malaria on a 24-year-old woman. Nowadays, splenectomy has a therapeutic role in some hematologic pathologies. Immune Thrombocytopenic Purpura (ITP) treatment includes corticosteroids and other immunosuppressive drugs. Children have good response to corticotherapy, in contrast adults respond poorly. Splenectomy is only considered as ITP treatment when there is no response to medicamentous therapy[2]. Patients with ITP and indication to splenectomy present severe thrombocytopenia, therefore they need platelets transfusion. Measures to reduce transfusions are well accepted among doctors as it is known the great difficult to find blood donors and the risks involved to transfusion. The aim of this study is to compare the rates of platelets and red blood cells transfusions between a group of patients where preoperative embolization of splenic artery was performed before splenectomy and a group in which embolization was not performed.

METHODS

A retrospective controlled study comparing the necessity of platelets and red blood cells transfusion in patients submitted to splenectomy for ITP between October 1999 and April 2008 was performed at São Lucas Hospital – PUC-RS.

The experimental group includes individuals in sequence that received preoperative embolization of splenic artery. The control group consists of individuals that have already been submitted to splenectomy without prior embolization. The main outcome was associated to the necessity or not of platelets and red blood cells transfusions.

All patients were submitted to surgery for Idiopathic Thrombocytopenic Purpura resistant to clinical treatment by the same team at São Lucas Hospital – PUC-RS between October 1999 and April 2008. Preoperative Embolization (POE) was performed during 6 to 12 hours before the surgical procedure. The technique was performed through femoral artery puncture, catheterization of the splenic artery by fluoroscopy and infusion of Contour PVA particles with a 355-500µm diameter (Contour Emboli, Boston Scientific Cork Ltda Ireland) added to 30ml of iodized contrast. The volume to be embolized depends on a satisfactory initial splenic volume which is when it reaches 60 to 70% of the of the parenchyma volume. Laparoscopic splenectomy was the surgical approach of choice. Laparotomy by left subcostal incision was the surgical approach chosen when ultrasound demonstrated that the volume of spleen was above 1000 ml.

The practice guidelines of the American Society of Anesthesiologists were the criteria used to define the need of perioperative blood transfusion and hemoderivatives[3]. Red blood cells transfusion was necessary when hemoglobin concentration was less than 6g/dl. When hemoglobin concentrations were between 6 and 10g/dl blood transfusion was suggested in case of bleeding or in case of patients with (at) risk factors for complications of inadequate oxygenation (low cardiopulmonary reserve and high oxygen consumption). Platelet transfusion was indicated when the count was below $50x10^9$/l and/or in the presence of excessive bleeding.

Initially all laboratorial and clinical aspects that could determine differences in postoperative evolution of both groups were compared. Student's t Test was used to compare quantitative date that followed normal distribution. Non-parametric Mann-Whitney test was used in case of asymmetry. Categories of variables were compared through Chi-Square Test and Fisher Exact Test (due to small sample). The level of statistical significance was (a) and data were analyzed by SPSS 12.0.

Transfusion rate was estimated to be less or equal 20% for the group with preoperative embolization; however, for the group without preoperative embolization transfusion rate was higher or equal 80%. Thirty patients were necessary for the study 80% of power study, 10 patients with POE and 20 patients without POE, assuming a proportional rate of 1:3(POE: without POE) between the groups, significance level (a=0,05). This study was approved by the Research Ethics Committee of Sao Lucas Hospital – PUC-RS.

RESULTS

Considering the group studied, eleven patients had preoperative embolization of splenic artery and 18 patients did not have preoperative embolization. Data are presented in Table 1. Demographic variables and surgical technique were similar in the two groups. There was not difference among patients submitted to laparoscopic surgery in relation to the needs of transfusion (p=0,17). In the embolization group red blood cells or platelets transfusions were not necessary; however, in the group without embolization 9 patients received red blood cells (p=0,01) and 12 patients received platelets (p=0,001). Transfused patients received in average 3,2u adult PRBC and 9,2 u/µl of platelets. There was a significant increase in the number of platelets in the group who had preoperative embolization. During the period of the study there was no death in both groups.

DISCUSSION

The results depicted that in the group studied preoperative embolization of the splenic artery was an efficient way to avoid platelets and packed red blood cells transfusion. Totte and Poulin also demonstrated similar results in their studies.

In embolization group two patients with less than 50.000 platelets count its replacement was not necessary considering the subject criteria of the lack of ecchymosis or hematomas. Platelets replacement was not necessary in two patients of the embolization group that had less than 50.000 platelets considering the subject criteria of the lack of ecchymosis or hematomas. For those patients surgical procedure was accomplished and platelets replacement was considered during the transoperative period which was

Table 1 – *Characteristics of the patients of the study of splenectomy for idiopathic thrombocytopenic purpura submitted or not to preoperative embolization of the splenic artery.*

	Splenic Artery Embolization		
	Yes	No	
Characteristic	**n = 11**	**n = 18**	**P**
Age, year	29 (16 to 78)	32 (11 to 53)	0.71
Female, nº (%)	5 (40)	13 (71)	0.22
Platelets (u/µl) x 1000			
Basal	6 (4 to 17)	6 (1 to 20)	0.99
Surgery	75 (9 to 231)	6 (1 to 20)	<0.001
Immediate postoperative	133 (109 to 345)	125 (19 to 477)	0.29
7th postoperative day	345 (151 to 500)	215 (120 to 673)	0.26
Surgical technique, nº (%)			0.17
Laparotomy	4 (40)	4 (24)	
Laparoscopy	7 (60)	14 (76)	
Transfusion needs, nº (%)			
Adult PRBC	0 (0)	9 (47)	0.01
Platelets	0 (0)	12 (65)	0.001

Data are presented as median (minimum to maximum) or nº (percentage).

Adult PRBC: adult packed red blood cell.

not necessary. Regarding to preoperative embolization complications there was not observed any type of infection or hematoma at the site of the puncture. It is important to point out that probably because of the spleen ischemia all patients after embolization required opioid analgesia. An important datum was the need of opioid analgesia for all patients after embolization, probably because of the spleen ischemia. Neither the laparoscopic group nor the open surgery group revealed surgical morbidity. Currently in the literature, laparoscopic splenectomy approach is considered to be a safe technique with earlier recovery of the patient[4,5].

Stricted criteria have been increasily applied to hemoderivatives transfusions in the medical practice. Currently blood banks can perform laboratory tests to check hemoderivatives for several virus; therefore the risk of contamination is almost nil. In spite of that, we should not forget that some unknown virus may be transmitted to blood receptors and it is not known how the immune system will respond. Patients' infected by Hepatitis C virus is an example of contamination by blood transfusion in the past. In addition to that, due to the high technology and logistic of blood banks transfusions costs are very high. Another consideration is the lack of blood donors in hospitals with high number of surgeries. All measures in order to avoid blood transfusions are well accepted.

Multicentered studies should be considered to evaluate the effectiveness of embolization in a lager number of patients with regard to a few groups of patients with purpura are submitted to splenectomy.

REFERENCES

1. Coon WW.The spleen and splenectomy. Surg Gynecol Obst 1991;173:407-414
2. Akwari OE, Itan KMF, Coleman RE, Rosse WF. Splenectomy for primary and recurrent immune thrombocytopenic purpura (ITP). Ann Surg 1987;206:529-41.
3. Practice guidelines for perioperative blood transfusion and adjuvant therapies. Anesthesiology 2006;105:198-208
4. Totte E, Van Hee R, Kloeck I, Hendrickx L, Zachee P, Bracke P, Hermans P. Laparoscopic splenectomy after arterial embolization. Hepato-Gastroenterology 1998;45:773-776
5. Poulin E, Thibault C, Mamazza J, Girotti M, Côté G, Renaud A. Laparoscopic splenectomy: clinical experience of preoperative splenic artery embolization. Surgical Laparoscopy & Endoscopy 1993;3(6):445-450
6. Winslow ER, Brunt MB. Perioperative outcomes of laparoscopic versus open splenectomy: A meta-analysis with an emphasis on complications. Surgery 2003;134(4):647-655.

7. Cordera F, Long KH, Nagorney DM, McMurtry EK, Schleck C, Ilstrup D, Donohue JH. Open versus laparoscopic splenectomy for idiopathic thrombocytopenic purpura:clinical and economic analysis. Surgery 2003;134(1):45-52.

Correspondence address:
PLÍNIO CARLOS BAÚ
Ipiranga Av., 6690 sala 509
Zip code: 90610-000
Telephone: (51) 33364233
E-mail: pliniobau@via-rs.net