



Journal Homepage: - www.journalijar.com
**INTERNATIONAL JOURNAL OF
 ADVANCED RESEARCH (IJAR)**

Article DOI: 10.21474/IJAR01/1586
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/1586>



RESEARCH ARTICLE

Splenectomy Versus Splenectomy And Vasoligation In Management Of Secondary Hypersplenism In Patients With Asymptomatic Esophageal Varices.

Yasser A. Orban (M.Sc), Mohamed A. Al-Sharabassy (M.D), Ali H. El-Shewy (M.D), Abdelhafez M. Elshewael (M.D), Osama A. Eltihi (M.D) and Amr Ibrahim (M.D).

Department of general surgery, faculty of medicine, Zagazig university, Egypt.

Manuscript Info

Manuscript History

Received: 12 July 2016

Final Accepted: 23 August 2016

Published: September 2016

Key words:-

Hypersplenism. Portal hypertension.
 Esophageal varices. Vasoligation.

Abstract

Background: Gastroesophageal varices are the most serious consequence of portal hypertension due to the risk of rupture and hemorrhage, which is the most common lethal complication. Vasoligation i.e. left gastric vein ligation and devascularization of the upper 2/3 of the greater curvature of the stomach, when added to splenectomy in patients with hypersplenism and asymptomatic esophageal varices seems to be a solution against variceal bleeding. **Aim of this study** was to report the prophylactic effect of vasoligation when added to splenectomy versus splenectomy alone as a management of non bleeding esophageal varices. **Methods:** This is a prospective randomized comparative study including patients with hypersplenism with asymptomatic esophageal varices who presented to Surgery Department of Zagazig University during the period from March 2014 to March 2016. These patients were randomly divided into two groups with each had its management approach, splenectomy alone group: 17 patients and splenectomy and vasoligation group: 17 patients. The procedure was explained to the patients, and they were consented as regard to the postoperative morbidity and mortality. **Results:** There was statistically significant difference between both groups in which addition of vasoligation to splenectomy decreases the grade of the esophageal varices in patients with hypersplenism and asymptomatic esophageal varices (P value < 0.05). On the other hand, there was no statistical difference between the two groups as regard post-operative complication; fever (P = 0.730), chest infection (P = 0.697), portal vein thrombosis (P = 1), subphrenic collection (P = 0.310), wound infection (P = 0.310). **Conclusion:** Vasoligation when added to splenectomy has a significant effect on decreasing the grade of varices without additional morbidity, but unfortunately it doesn't eradicate it.

Copy Right, IJAR, 2016., All rights reserved.

Corresponding Author:- Yasser A Orban

Address:- Department of general surgery, faculty of medicine, Zagazig university, Egypt.

Introduction:-

Esophageal variceal bleeding is still the most lethal complication in cirrhotic patients with portal hypertension. Approximately 5–10% of patients with cirrhosis will develop esophageal varices per year, and about 25–30% of cirrhotic patients with esophageal varices and without previous variceal haemorrhage will bleed from ruptured varices⁽¹⁾.

Variceal bleeding is considered among the leading causes of death in cirrhotic patients. Therefore, the issue of primary prophylaxis of variceal bleeding is an important one. Bleeding-related mortality is extremely high, as 30-50% of patients will die within six weeks from the first episode of bleeding⁽²⁾.

Aim of this study was to report the prophylactic effect of vasoligation when added to splenectomy versus splenectomy alone on the grade of esophageal varices.

Patients and methods:

From March 2014 to March 2016 34 patients with final diagnosis of hypersplenism with asymptomatic esophageal varices were prepared to undergo either splenectomy alone (group I) or splenectomy and vasoligation (group II), devascularization of the upper 2/3 of the greater curvature of the stomach and left gastric vein ligation, at Surgery Department in Zagazig University.

Inclusion criteria were: 1) to have diagnosis of hypersplenism; 2) aged 18-70 years; 3) patients with esophageal varices have no history of bleeding esophageal varices; 4) compensated liver disease with child A score.

Exclusion criteria were: 1) current pregnancy; 2) age < 18, > 70 years; 3) patients with history of bleeding esophageal varices; 4) patients with decompensated liver disease, Child's C score.

The study was reviewed and approved by the review board of our faculty and informed consent was obtained from all patients.

All patients were preoperatively investigated by complete blood count (CBC), PT, PTT, INR, liver and kidney functions, bone marrow aspirate, hepatitis B, C viral markers, anti-bilhazial antibody titre . Pelvi-abdominal ultrasound with Doppler study of the portal vein was done. Upper gastro-intestinal endoscopy was done to detect esophageal varices which were graded according Thakeb classification⁽³⁾.

All patients received preoperative Prophylaxis against sepsis after splenectomy with vaccination for meningococcus, pneumococcus and Haemophilus influenza.

Surgical procedure:-

Abdominal access was performed by midline incision. The main steps of the surgical procedure were: 1) access to the lesser sac; 2) ligation of the splenic artery in the upper border of the pancreas; 3) splenectomy by a standardized technique⁽⁴⁾. For patients to whom vasoligation was added after splenectomy: 1) devascularization of the upper two thirds of the greater curvature of the stomach; 2) left gastric vein ligation; while the greater curvature was lifted up, the lesser curvature of the stomach was dissected till the left gastric vein exposed. Platelets were prepared and being ready for infusion after splenic artery ligation if the platelets count less than 50,000/ul.

Follow up:-

Clinical assessment and registration of postoperative complications during hospital stay and at the outpatient clinic during the follow-up period, Pelvi-abdominal ultrasound with Doppler study was performed post-operatively. Upper gastro-intestinal endoscopy was performed to all patients with grading of varices according to thakeb classification postoperatively during the hospital admission, one month and three months after surgery.

Statistical analysis:-

All patients' data were collected, checked and analyzed by using (SPSS version 19). Data were expressed as mean \pm standard deviation (SD) and number with (%) according to type of variable. Chi-square test (χ^2) or Fischer's exact test, Mann-Whitney, paired t test and Pearson correlation were used when appropriate. P value <0.05 was considered statistically significant.

Results:-

The total number 34 patients were included in the study. 17 patients underwent splenectomy alone (group I) and 17 patients under-went splenectomy and vasoligation (group II). In splenectomy alone group, there were 10 female patients and 7 male patients with age ranging from (26-60) and mean age (44.41), but in splenectomy and vasoligation group, 9 patients were males and 8 were females, their ages ranged from (37-56) with mean age was (48.17) (table 1).

All patients had hypersplenism in which thrombocytopenia was found in all patient or in combination with leucopenia, anemia or both (table 3).

All patients of our study showed dilated portal vein with mean diameter 13.94 ± 2.304 mm in group I and 14.64 ± 2.059 mm in group II. There was significant reduction in the portal vein diameter after surgery in both groups of patients (table 4).

In this study, all grades of varices were found in our study with grade II and III esophageal varices were prevailing. Postoperatively there was no improvement in the grade of varices in group I but there were statistically significant improvement of the grade of varices in a considerable percentage of patients in group II (table 7).

Regarding post-operative complication, fever and chest infection were the most common complications (table 8).

(Table 1) shows the sex distribution and mean age of patients in each group.

Sex	Males	Group I	Group II
	Females	7 (41.2%)	8 (47.1%)
		10 (58.8%)	9 (52.9%)
Age	minimum	26	37
	maximum	60	56
	Mean \pm SD	44.41 ± 9.695	48.17 ± 5.615

(Table 2) causes of portal hypertension among patients in this study.

Cause of portal hypertension	Group I		Group II	
	HCV	10 (58.8%)	8 (47.1%)	
	HBV	1 (5.9%)	1 (5.9%)	
	Bilhasiasis	4 (23.5%)	2 (11.8%)	
	HCV +HBV	1 (5.9%)	2 (11.8%)	
	HCV + Bilhasiasis	1 (5.9%)	4 (23.5%)	

(Table 3) blood element affection of the patients of the study.

	No cytopenia	Thrombocytopenia	Two cell affection		Pancytopenia	Total	X ²	P
			↓plat +↓WBCs	↓plat +↓RBCs				
Group I	0 (0 %)	7 (41.17%)	4 (23.5 %)	3 (17.6 %)	3 (17.6 %)	17	1.8	0.179
Group II	0 (0 %)	6 (35.29%)	3 (17.6 %)	4 (23.5 %)	4 (23.5 %)	17		
Total	0 (0 %)	10 (29.4 %)	7 (20.6%)	10 (29.4 %)	7 (20.6 %)	34		

(Table 4) Changes in the portal vein diameters from preoperative to 3 months after surgery.

Group		range	Mean \pm SD	t	P
Group I	Pre-operatively	12-19mm	13.94 ± 2.304	3.887	0.001
	3 months Postoperatively	12-16mm	12.94 ± 1.390		
Group II	Pre-operatively	12-19mm	14.64 ± 2.059	3.771	0.002
	3 months Postoperatively	12-16mm	13.70 ± 1.424		

(Table 5) The correlation between portal vein diameter and the grade of varices

Group	N	Pearson correlation between PVD and the grade of EV	P value	Significance
Group I	17	0.364	0.151	No statistically significant relation between PVD and the grade of EV
Group II	17	-0.020	0.939	

(Table 6) changes in blood cells from preoperative to 3 month postoperative

			Range	Mean \pm SD	Paired t test	P value
Group I	Platelets, $10^3/\mu\text{L}$	Pre-op	28-70	46.17 \pm 11.89	-25.19	0.000
		3 month postop	180-243	201.41 \pm 19.06		
	RBC, $10^6/\mu\text{L}$	Pre-op	3.1-5.8	4.43 \pm 0.76	-6.019	0.000
		3 month postop	4.7-5.9	5.41 \pm 0.36		
	WBC, $10^3/\mu\text{L}$	Pre-op	1.9-8.2	4.85 \pm 2.147	-2.495	0.023
		3 month postop	4.1-9.2	6.49 \pm 1.562		
Group II	Platelets, $10^3/\mu\text{L}$	Pre-op	28-64	43.294 \pm 10.82	-31.71	0.000
		3 month postop	180-233	199.94 \pm 15.36		
	RBC, $10^6/\mu\text{L}$	Pre-op	3.0-5.0	4.264 \pm 0.600	-5.355	0.000
		3 month postop	4.5-5.8	5.205 \pm 0.456		
	WBC, $10^3/\mu\text{L}$	Pre-op	1.9-8.2	4.858 \pm 2.147	-2.577	0.020
		3 month postop	4.5-9.1	6.499 \pm 1.338		

(Table 7) changes in esophageal varices grade from preoperative to 3 month postoperative.

Oesophageal Varices grading		I	II	III	IV	Z-value	P
Group I	Pre-op.	5	7	4	1	No improvement recorded	
	Post-op.	I	II	III	IV		
		5	7	4	1		
Group II	Pre-op.	2	7	7	1	-2.645	0.008
	Post-op.	I	I	II	III		
		2	3	4	3		

(Table 8): shows postoperative complications.

Post-operative complications	Splenectomy alone	Splenectomy plus vasoligation	X ²	P
fever	7 (41.2 %)	8 (47.1 %)	0.119	0.730
Chest infection	4 (23.5 %)	5 (29.4 %)	0.151	0.697
Portal vein thrombosis	1 (5.8 %)	1 (5.8 %)	0	1
Subphrenic collection	1 (5.8 %)	0 (0 %)	1.03	0.310
Wound infection	0 (0 %)	1 (5.8 %)	1.03	0.310
Incisional hernia	1 (5.8 %)	2 (11.8 %)	0.366	0.545

Discussion:-

Massive hemorrhage of the upper gastro-intestinal tract resulting from esophageal varices, which are mainly supplied by an enlarged left gastric vein draining to the portal vein, is a major complication of liver cirrhosis and portal hypertension. At least two-thirds of patients with cirrhosis develop the varices, and approximately 10–60% of patients experience variceal bleeding ⁽⁵⁾.

Since 1992, University Hospitals of Recife and Brazil have used splenectomy with left gastric vein ligation as the treatment of choice in patients with schistosomiasis mansoni and a history of esophageal variceal bleeding. This is a simple technique, which has a low morbidity and mortality ⁽⁶⁾.

Our work aimed to evaluate the effect of vasoligation when added to splenectomy on the esophageal varices grade in comparison to splenectomy alone. Also evaluate both procedures as regard post-operative complications.

The prevalence of hepatitis C viral infection among patients in this study was 70.58% (12 patients) in group I and 82.35% (14 patients) in group II. HCV infection was found either alone [10 patients (58.8%) in group I and 8 patients (47.1%) in group II] or with co-infection with HBV [1 patient (5.9%) in group I and 2 patients (11.8%) in group II] or Bilhasiasis [1 patient (5.9%) in group I and 4 patients (23.5%) in group II] (table 2).

In our study, we found preoperatively that thrombocytopenia was found in 34 patients (100%) either in the form of single cell line affection, only the platelet count was decreased, in 7 (41.2 %) patients in group I and 6 (35.29%) patients in group II or in combination with either leucopenia 4 (23.5 %) patients in group I and 3 (17.6 %) patients in group II, erythropenia 3 (17.6 %) patients in group I and 4(23.5 %) patients in group II or both 3 (17.6 %) patients in group I and 4 (23.5 %) patients in group II. There was no significant difference between both groups preoperatively (table 3). We found that thrombocytopenia and other blood cell impairment were corrected in all patients in both groups (table 6).

In this study, we had different grades of esophageal varices. In group I there were 5 patients with esophageal varices grade I, 7 patients with grade II, 4 patients with varices grade III and 1 patient with varices grade IV. None of the patients in group I showed either improvement or worsening in the grade of varices postoperatively. In group II, we had 2 patients with esophageal varices grade I, 7 patients with varices grade II, and 7 patients grade III and 1 patient with varices grade IV (table 3).

There were improvements in the grade of varices postoperatively in 7 patients (41%) of them 3 patients had varices grade II improved to grade I postoperatively and 3 patients with varices grade III improved to grade II as well as 1 patient with esophageal varices grade IV improved to grade III. There was no improvement in patients with varices in grade I. The improvement of varices in group II of patients was statistically significant with p value < 0.05. But, disappearance of varices couldn't be detected in this group (table 7).

In 2002, Lacerda and co-workers found improvement in the grade of varices in 4 (20%) of 20 patients after splenectomy and left gastric vein ligation. This difference from our study may be due to the use of a grading system for varices differed from that we used. Also **lacerda** found decrease in the variceal pressure after splenectomy and left gastric vein ligation using non-invasive technique for measuring the variceal pressure in all patients of his study ⁽⁶⁾.

In 2013, **Batista-neto and his colleagues**, on contrary, found a total eradication of varices in 15.4% (4/26) of patients after splenectomy and left gastric vein ligation without sclerotherapy ⁽⁷⁾.

In this study, we found that the portal vein diameter preoperatively was dilated (> 12 mm in diameter) in both groups with mean values 13.94 ± 2.304 and 14.64 ± 2.059 in group I and II respectively (table 4). But there was no correlation between portal vein diameter and the degree of esophageal varices (table 5). The portal vein diameter was decreased significantly postoperatively in both groups of patients. In group I, the mean portal vein diameter was 12.94 ± 1.390 three months postoperatively compared to 13.94 ± 2.304 preoperatively with P value = 0.001. In group II, the mean portal vein diameter was 13.70 ± 1.424 three months postoperatively compared to 14.64 ± 2.059 preoperatively with P value = 0.002 (table 4).

Rani and his colleagues in 2015 concluded that the diameter of portal vein on US examination is an indirect indicator of portal pressure which is responsible for development of varices. Portal vein of a diameter greater 13 mm can be considered as a non-invasive predictor of esophageal varices ⁽⁸⁾. **Liu and his colleagues in 2013**, found that there is reduction of the

portal vein diameter after a modified Hassab's procedure from 14.5 ± 2.2 preoperatively to 12.9 ± 1.6 postoperatively which was found statistically significant with P value > 0.0001 ⁽⁹⁾.

In this study there was no statically significant difference between both groups of patients as regard post operative complication. The most common postoperative complication we had is postoperative fever and chest infection (table 8).

Conclusions:-

Based on this study, we can conclude that:

1. Hypersplenism was corrected significantly after both types of surgical procedures.
2. No significant correlation was found between the portal vein diameter and the grade of varices but, we can predict the presences of esophageal varices in patients with portal vein diameter greater than 12 mm.
3. Portal vein diameter was significantly reduced after both types of surgical procedures.
4. Splenectomy alone has no effect on the degree of the varices.
5. Vasoligation when added to splenectomy has a significant effect on decreasing the grade of varices, but unfortunately it doesn't eradicate it.

Recommendations:-

We recommend to do devascularization of the upper 2/3 of the greater curvature of the stomach together with proper ligation of the left gastric vein as a routine technique during splenectomy for patients with hypersplenism in whom esophageal varices are not manifested by bleeding as a primary surgical prophylaxis, as it decrease the grade of varices without additional complication to the patient.

Long term follow up for up to 10 years is needed to see the remote effect on both techniques.

References:-

1. **Zhang C., Thabu D., Kamat P. and Shah V. (2010):** Esophageal varices in cirrhotic patients: from variceal screening to primary prophylaxis of the first esophageal variceal bleeding. *Liver International*, 9: 108-119.
2. **Triantos C. and Vlachogiannakos J. (2006):** Primary Prevention of Bleeding from Oesophageal Varices. *Hospital Chronicles*, 1: 83-92.
3. **Thakeb F., Aly Y., El-Fiki A., Taha H. and El-Rooby A. (1987):** the study of the esophagus by endoscopy and radiology after sclerotherapy. *J. Egypt. Med. Assoc.*, 70:51-60.
4. **Appleton S. and Roy D. (2013):** Spleen. In: Kirk's general surgical operations, 6th edition, edited by: Novell R., Baker D. and Goddard N., published by: Elsevier Ltd, UK. Ch.18:315-321.
5. **Zhou H., Chen T., Zhang X. Zeng N. and Zhou L. (2014):** Diameters of left gastric vein and its originating vein on magnetic resonance imaging in liver cirrhosis patients with hepatitis B: Association with endoscopic grades of esophageal varices. *Hepatology Research*, 44: E110–E117.
6. **Lacerda C., Freire W., Melo P., Lacerda H. and Carvalho G. (2002):** Splenectomy and ligation of the left gastric vein in schistosomiasis mansoni: the effect on esophageal variceal pressure measured by a non-invasive technique. *Keio. J. Med.*, 51: 89–92.
7. **Batista-neto J., Tognetti I., Ribeiro L., Balwani M., Muritiba T. and Alves E. (2013):** Evolutional profile of the esophageal varices after splenectomy associated with ligation of the left gastric vein and sclerotherapy in schistosomal portal hypertension. *ABCD Arq Bras Cir Dig.*, 26:49-53
8. **Rani S., Sudarsi B., Siddeswari R. and Manohar S. (2015):** Correlation of portal vein size with esophageal varices severity in patients with cirrhosis of liver with portal hypertension. *International Journal of Scientific and Research Publications*, 5:1-5.
9. **Liu Y., Li Y., Ma J., Lu L. and Zhang L. (2013):** A modified Hassab's operation for portal hypertension: experience with 562 cases. *Journal of Surgical Research*, 185:463-468.