SIZE OF GASTROESOPHAGEAL VARICES: ITS BEHAVIOR AFTER THE SURGICAL TREATMENT OF PORTAL HYPERTENSION

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STRAUSS E et al. - Size of gastroesophageal varices: Its behavior after the surgical treatment of portal hypertension. **Rev. Hosp. Clín. Fac. Med. S. Paulo 54** (6):193-198, 1999.

SUMMARY: The size of gastroesophageal varices is one of the most important factors leading to hemorrhage related to portal hypertension. An endoscopic evaluation of the size of gastroesophageal varices before and after different operations for portal hypertension was performed in 73 patients with schistosomiasis, as part of a randomized trial: proximal splenorenal shunt (PSS n=24), distal splenorenal shunt (DSS n=24), and esophagogastric devascularization with splenectomy (EGDS n=25). The endoscopic evaluation was performed before and up to 10 years after the operations. Variceal size was graded according to Palmer's classification: grade 1 – up to 3 mm, grade 2 – from 3 to 6 mm, grade 3 – greater than 6 mm, and were analyzed in four anatomical locations: inferior, middle or superior third of the esophagus, and proximal stomach. The total number of points in the pre-operative grading minus the number of points in the post-operative grading gave a differential grading, allowing statistical comparison among the surgical groups. Good results, in terms of disappearance or decrease of variceal size, were observed more frequently after PSS than after DSS or EGDS — 95.8%, 83.3%, and 72%, respectively. When differential grading was analyzed, a statistically significant difference was observed between PSS and EGDS, but not between proximal and distal splenorenal shunts. In conclusion, shunt surgeries were more efficient than devascularization in diminishing variceal size.

DESCRIPTORS: **Hepatosplenic Schistosomiasis. Portal hypertension. Esophageal varices. Surgical treatment. Variceal size.**

Nowadays, there are many options besides surgery for the elective treatment of portal hypertension. Endoscopic methods as sclerotherapy[1], and band ligation[2], are widely used either isolated or in different combinations[3] whereas N-butyl 2 cyanoacrylate[4] can also be used for obliteration of the varices. Medical therapies comprise different types of drugs such as beta blockers[5] or many others[6], and a vascular approach is transjugular portosystemic shunting (TIPPS)[7]. The ultimate goal in any type of treatment for portal hypertension is the elimination of the gastroesophageal varices, or at least reduction of variceal size, since the presence of gastroesophageal varices is one of the major factors implicated in re-bleeding[8].

Surgical treatment aiming at deviation of portal blood to the systemic circulation would be a preferential choice if severe side effects, such as hepatic encephalopathy, could be avoided. In an attempt to maintain good results without undesirable side effects, technical modifications have been introduced. The splenorenal shunt was supposed to be as effective as portocaval shunt, with lower incidence of portosystemic encephalopathy; whereas selective decompression of the gastroesophageal venous plexus through a distal splenorenal shunt could also be an effective option. Theoretically, devascularization of the gastroesophageal area tends to maintain a high portal pressure and therefore a good perfusion to the liver, with the inconvenience of re-appearance of gastroesophageal varices, with a higher risk of re-bleeding[9].

In a previous paper, we published the clinical results of a randomized trial comparing the long-term efficacy of these three types of surgery[10]. Although prevalence of re-bleeding was not statistically different among the three groups, comparison of the endoscopic data has not been performed so far. In contrast with many studies, the patients of our earlier trial did not undergo endoscopic or pharmacologic therapy during the follow-up period. The purpose of this study was to evaluate the real contribution of each type of surgery to alterations in the status of the varices, particularly regarding size.

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PATIENTS AND METHOD

Seventy-three patients with hepatosplenic schistosomiasis and portal hypertension, randomly assigned to three types of surgery to prevent rebleeding, were evaluated endoscopically for gastroesophageal status. This protocol was approved by the Ethical Committee of the hospital, and a written informed consent was obtained from each patient.

Two shunt procedures namely proximal splenorenal shunt (PSS) and distal splenorenal shunt (DSS) were compared to esophagogastric devascularization with splenectomy (EGDS). The inclusion criteria for entering the study were: a) diagnosis of Mansoni Schistosomiasis based on epidemiological, clinical, and parasitological data and confirmed by histopathological analysis of the wedged liver biopsy taken at the time of operation; b) age from 18 to 55 years; c) minimum interval of 15 days between last hemorrhage and operation; d) absent or easily controlled ascites; e) absence of chronic alcoholism, liver failure, cirrhosis, peptic ulcer, diabetes, renal failure, and portal thrombosis at angiography; f) minimum follow-up of 12 months, g) absence of endoscopic, pharmacologic, or any other kind of treatment for the portal hypertension during the whole follow-up period.

Varices, present in all patients before the operation, were classified according to: a) their anatomical location – inferior, middle or superior part of esophagus, and proximal stomach and b) their size — grade 0 = no varices, grade 1 = varices diameter up to 3 mm, grade 2 = varices diameter from 3 to 6 mm, and grade 3 = varices diameter greater than 6 mm[11]. According to the protocol, endoscopic evaluation was performed before the surgical procedure and every one or two years until 5 or 10 years of follow-up. All patients had a first evaluation one year after surgery, and only 7 of them (9.6%) had only two endoscopic examinations. The latest evaluation, usually 5 or 10 years after surgery, was considered for statistical analysis. The mean period of time between surgery and the final evaluation was 5.83 +/-3.05; 6.00 +/-3.05, and 6.12 +/-2.77 years respectively for PSS, EGDS and DSS.

Under comparative assessment, the gastroesophageal varices could : I) disappear, II) decrease III) remain unchanged, or IV) increase during follow-up. The post-operative endoscopic evaluation was also compared to pre-operative data by summing up the grades given to the size of varices — 0 to 3 — in the four different anatomic sites. The total number of points in the pre-operative grading (P) minus the total number of points in the final grading (E) was used for statistical comparisons among the three types of operations. The statistical method applied was variance analysis with multiple amplitude comparisons using the test of Ryan-Einot-Gabriel-Welsch[12], and using SAS (Statistical Analysis System) software.

RESULTS

In Tables 1, 2, and 3 the time of the latest endoscopic evaluation, total number of points before (P) and after surgery (E), as well as the difference between them, is depicted respectively to PSS, EGDS, and DSS.

When the differential gradings in the three groups of patients were compared, a statistically significant difference was obtained. The positive values for PSS were the highest (3.5 +/-2.9) and significantly different from EGDS (1.4 +/-3.3). Nevertheless, when DSS

Table 1 – Results of the endoscopic evaluations in the group of patients who received a proximal splenorenal shunt: time of latest endoscopy, total number of points in the pre-operative grading, post-operative grading and its difference.

Nº	Time of Follow-up (years)	Pre-operative Number	Post-operative Number	Difference
1	10	4	0	+4
2	5	6	0	+6
3	10	3	1	+2
4	5	8	4	+4
5	5	2	0	+2
6	10	2	1	+1
7	10	2	0	+2
8	5	2	0	+2
9	1	6	2	+4
10	10	5	2	+3
11	5	9	0	+9
12	1	1	0	+1
13	5	2	0	+2
14	5	4	2	+2
15	10	6	0	+6
16	2	2	1	+1
17	5	12	0	+12
18	5	7	9	-2
19	5	6	4	+2
20	1	7	4	+3
21	5	4	2	+2
22	5	7	1	+6
23	5	5	0	+5
24	10	7	1	+6
Mean	5.83	4.95	1.41	3.54
S.D.	3.05	2.72	2.10	2.91

Table 2 - Results of the endoscopic evaluations in the group of patients who underwent esophagogastric devascularization with splenectomy: time of latest endoscopy, total number of points in the pre-operative grading, post-operative grading and its difference.

Nº	Time of Follow-up (years)	Pre-operative Number	Post-operative Number	Difference
1	10	3	2	+1
2	5	9	8	+1
3	10	8	7	+1
4	10	4	4	0
5	10	9	2	+7
6	5	1	5	-4
7	5	5	8	-3
8	10	2	4	-2
9	10	5	2	+3
10	10	3	2	+1
11	1	6	1	+5
12	5	5	8	-3
13	3	4	3	+1
14	10	6	2	+4
15	2	6	1	+5
16	5	6	0	+6
17	5	2	0	+2
18	3	4	4	0
19	5	6	12	-6
20	5	4	3	+1
21	5	5	3	+2
22	5	6	5	+1
23	5	5	0	+5
24	5	6	1	+5
25	1	4	3	+1
Mean	6.00	4.96	3.60	1.36
S.D.	3.05	1.98	3.01	3.32

Table 3 - Results of the endoscopic evaluations in the group of patients who received a distal splenorenal shunt: time of latest endoscopy, total number of points in the pre-operative grading, post-operative grading and its difference.

Nº	Time of Follow-up (years)	Pre-operative Number	Post-operative Number	Difference
1	10	8	4	+4
2	5	1	1	0
3	10	5	1	+4
4	10	3	1	+2
5	10	4	2	+2
6	1	4	4	0
7	5	2	1	+1
8	5	2	0	+2
9	5	4	0	+4
10	5	7	0	+7
11	10	5	6	+1
12	5	3	0	+3
13	5	6	2	+4
14	5	2	0	+2
15	5	6	2	+4
16	5	7	2	+5
17	5	6	4	+2
18	1	2	1	+1
19	5	2	2	0
20	10	4	0	+4
21	5	5	1	+4
22	10	3	0	+3
23	5	4	2	+2
24	5	6	1	5
Mean	6.12	4.21	1.54	2.67
S.D.	2.77	1.91	1.58	1.94

is compared either to PSS or EGDS, a significant difference could not be found (Table 4).

Good results, in terms of disappearance or decreasing of the variceal size, were observed more frequently after PSS than DSS or EGDS (Table 5). Increasing of variceal size, on the other hand, was observed in 20% of the cases after EGDS and in only 4.2% (one case) after the two shunt procedures.

Figure 1 illustrates the pre-operative and post-operative variceal sizes in the four anatomic sites. Gastric varices, present in 33.3%, 20.8%, and 12.0% before respectively, PSS, DSS, and EGDS, were present in 0%, 16.6% and 28.0% in the follow-up period.

DISCUSSION

The identification of risk factors for gastroesophageal bleeding is of utmost importance, not only for prophylaxis of the first hemorrhage episode, but also for patients with risk of re-bleeding. There is a consensus that bleeding seems to be high in patients with medium to large varices, although other endoscopic, hemodynamic, and clinical factors have also been associated with risk of gastroesophageal bleeding[13,14].

More recently, metabolic variables, such as poor nutritional status, low serum albumin, and decreased clotting factors were independently associated with a higher risk of bleeding in cirrhosis[15]. Although interesting, these clinical parameters may be related more to the hepatic insufficiency of severe cirrhosis than to portal hypertension itself. On the other hand, the endoscopic risk factors, such as size of varices or red whale markings would be applicable to portal hypertension due to other etiologies besides cirrhosis.

The hepatosplenic form of Mansoni's schistosomiasis is an excel-

Table 4 - Differential grading of gastroesophageal varices between pre-operative and post-operative period.

Type of Surgery	Mean	S. D.	Minimum	Maximum
PSS	3.5	2.9	-2*	12
EGDS	1.4	3.3	-6*	7
DSS	2.7	1.9	-1*	7

F = 3.86; p = 0.026; S.D. = standard deviatio; * = Negative numbers correspond to an increase of variceal size when compared to pre-operative status.

MULTIPLE COMPARISON OF AMPLITUDE

Operations	Conclusion
PSS X EGDS	*
PSS X DSS	N.S.
EGDS X DSS	N.S.

* = statistically significant at the level of 5%.
N.S. = not significant.

Table 5 - Comparison of the variations of the size of gastroesophageal varices before and after different operations

Type of Surgery	PSS	EGDS	DSS	TOTAL
Varices				
Disappear	11 (45.8%)	3 (12%)	7 (29.2%)	21
Decrease	12 (50.0%)	15 (60%)	13 (54.1%)	40
Unchanged	0	2 (8%)	3 (12.5%)	5
Increase	1 (4.2%)	5 (20%)	1 (4.2%)	7
Total	24	25	24	73

PSS = proximal splenorenal shunt.
EGDS = esophagogastric devascularization with splenectomy.
DSS = distal splenorenal shunt.

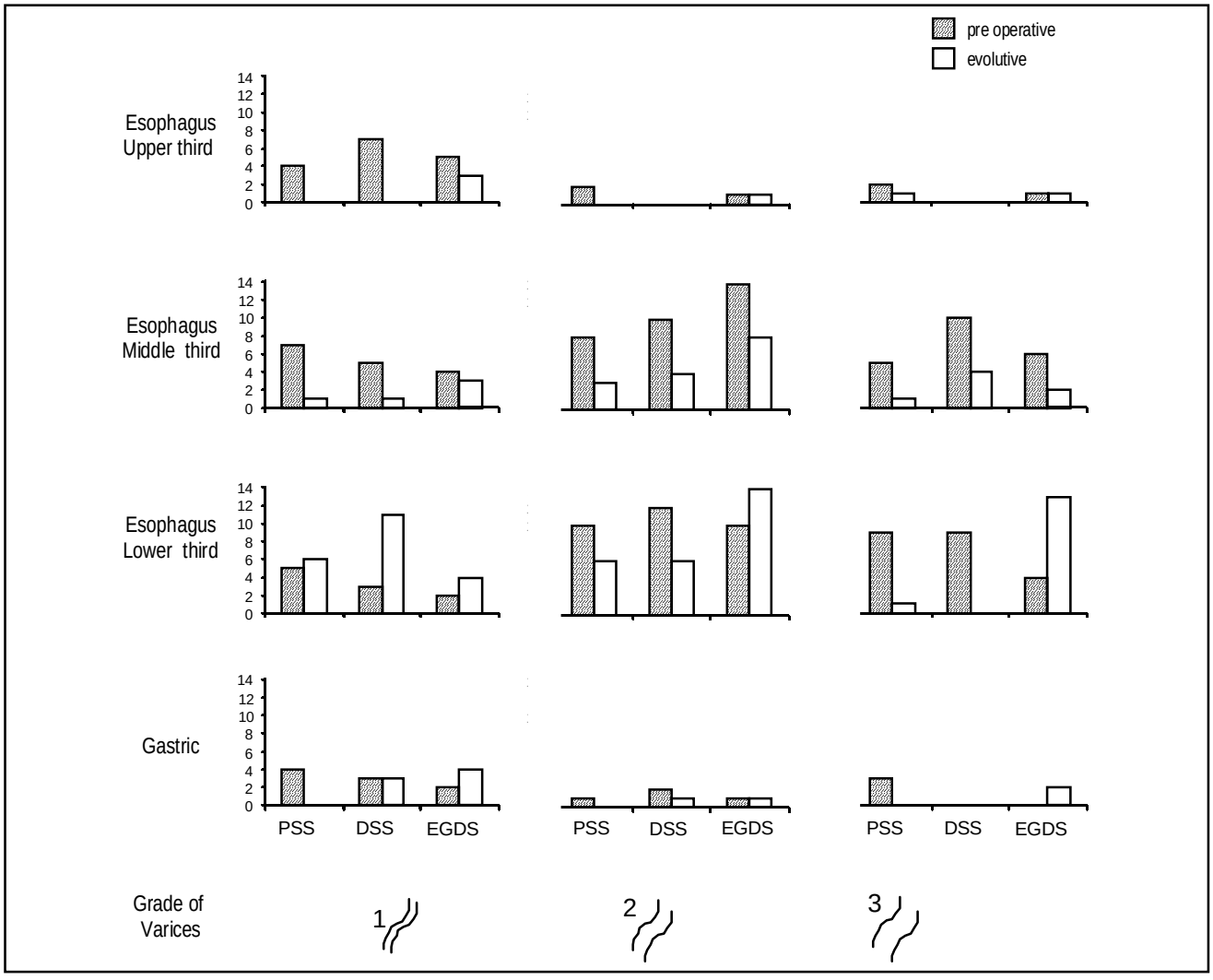

Figure 1 - Illustration of variceal size in the four anatomic sites.

lent model for the evaluation of therapeutic procedures in portal hypertension. Upper gastrointestinal hemorrhage, occurring as a consequence of gastroesophageal varices, is the most outstanding clinical feature, whereas alterations of liver function are usually slight, if present at all.[9,16] Thus it is possible to evaluate the consequences of portal hypertension separately from those of hepatic insufficiency. This evaluation is difficult to accomplish in patients with cirrhosis.

A common and easily reproducible method for comparing variceal size before and after a therapeutic procedure is to evaluate whether varices have disappeared, decreased, remained unchanged, or increased. The different percentages obtained in each group, as shown in Table 5, point to a better performance of PSS and worse results after EGDS, although these percentages do not allow statistical comparisons.

A major problem in comparing variceal size to evaluate effectiveness of a therapeutic procedure is the subjectivity of the procedure. Quantification of variceal size alterations would be an ideal approach, if possible. Since a direct measure is not usually performed, a numerical value (from 0 to 3) was obtained using a known classification, in which the terms grade 1, grade 2 and grade 3 correspond to well known and accepted criteria of variceal size in millimeters[11].

To our knowledge this is the first time, a statistical analysis has been performed to compare variceal size. It was interesting to verify that after the three surgical treatments, a good average result was achieved in terms of diminishing variceal size. Since we have subtracted from the pre-operative values those obtained during the follow-up, as shown in Tables 1, 2, and 3 and in Fig. 1, a positive number is indicative of smaller varices. On the other hand, in every type of surgery we also obtained negative numbers, corresponding to patients who developed larger varices during the follow-up.

Presence of gastric varices is a common finding in portal hypertension[17]. In that study, gastric varices were found in 12 to 33.3% of the cases in the three groups of patients in the pre-operative period. When patients underwent shunt surgeries, a decrease in size after distal splenorenal shunt and disappearance after a proximal splenorenal shunt were observed.

As shown in Fig. 1 the percentage of gastric varices has increased after esophagogastric devascularization, similarly to what may happen after sclerotherapy, when high levels of portal hypertension persist. Hemodynamic studies have recently shown that portal pressure can either decrease or increase after sclerotherapy, depending on presence or absence of spontaneous collateral circulation in each patient[18].

Similarly to what we have observed in the long-term clinical comparison among the three types of surgery, it was not possible to isolate the effects of DSS from EGDS. On the other hand EGDS, the surgery with the best results in terms of survival and lack of side effects, was the less effective in terms of improving the gastroesophageal varices status.

RESUMO

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STRAUSS E e col. - Variações no calibre das varizes esôfago-gástricas após tratamentos cirúrgicos de hipertensão portal. **Rev. Hosp. Clín. Fac. Med. S. Paulo 54** (6): 193-198, 1999.

Um dos mais importantes fatores que levam à hemorragia digestiva por hipertensão portal é o calibre das varizes esôfago-gástricas. Visamos, no presente trabalho, avaliar endoscopicamente as variações de calibre antes e após diferentes cirurgias de hipertensão portal, realizadas em 73 pacientes com esquistossomose hépato-esplênica, no contexto de um estudo controlado e aleatorizado, sendo 24 deles submetidos a Anastomose Espleno-Renal (AER), 24 a Descompressão Portal Seletiva (DPS) e 25 a Desconexão Azigo-Portal com Esplenectomia (DAPE). As avaliações endoscópicas foram realizadas antes e até 10 anos após as cirurgias. O calibre das varizes foi classificado, segundo Palmer como de grau 1- até 3mm, grau 2 de 3 a 6 mm e grau 3 quando maiores do que 6mm de diâmetro, analizadas em quatro localizações anatômicas a saber: terços inferior, médio e superior do esôfago e estômago proximal. A somatória do número de pontos na gradação pré-operatória menos a somatória dos pontos na gradação evolutiva forneceu um número correspondente ao diferencial, que permitiu a comparação estatística entre os diferentes grupos cirúrgicos. Na avaliação qualitativa, bons resultados, correspondendo ao desaparecimento ou diminuição do calibre da varizes, foram encontrados mais freqüentemente após a AER do que DPS ou DAPE - respectivamente 95,8%, 83,3% e 72%. A análise estatística dos

diferenciais de gradação demonstrou diferença estatisticamente significante favorecendo a AER em relação à DAPE, não havendo diferenças entre AER e DPS. Em conclusão, as cirurgias de anastomose ("shunt") foram mais eficientes do que a desvascularização, em termos de diminuir o calibre de varizes esôfago-gástricas.

DESCRITORES: **Esquistossomose hépato-esplênica. Hipertensão portal. Varizes esofágicas. Tratamento cirúrgico. Calibre de varizes.**

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