

## Studies on the Results of the Nonshunting Procedures for Portal Hypertension<sup>\*)</sup>

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### ABSTRACT

The number of operations for portal hypertension performed, in our institute, during the period of 1973 through 1981 was 68. The nonshunting procedure used on all of them was the Tokyo-University-Second-Surgery method (Sugiura's method). The results of these operations have been studied and presented in this paper.

It was noted that the mortality was 7.7% by Sugiura's method, as compared to 13.3% by transthoracic esophageal transection (esophageal transection), and 18.5% by Hassab's method. According to Child's classification, Child A was 0%, B, 9.8% and C, 35.7%.

The accumulated survival rate proved good after Sugiura's method, as classified by the formula, in idiopathic portal hypertension (IPH), as classified by the basic disease, in prophylactic operation, as classified by the time of surgery, and in Child A, according to Child's classification, respectively. Esophageal varices examined with an endoscope disappeared for the most part after Sugiura's method, indicating good improvement. After Sugiura's method, no recurrence of bleeding was observed, whereas after esophageal transection, one case of bleeding (6.7%) and one case (3.7%) after Hassab's operation were noted.

The results suggest that Sugiura's method is associated with the best results when the mortality, accumulated survival rate, endoscopic findings, and the recurrence rate of bleeding are considered.

### INTRODUCTION

For the complications of portal hypertension, esophageal varices as a collateral route, splenomegaly and ascites can be cited. Among these complications, ascites now hardly stands for the target of the surgical treatment, thanks to the progress of internal medicine, and nowadays the majority of operations for portal hypertension are those for esophageal varices.

Although the method of operation differs according to the basic disease, it is roughly

classified into the shunt operation and the nonshunting procedure. The selection of either one is currently controversial. As the authors are concerned, however, the nonshunting procedure mainly with Sugiura's method<sup>8)</sup> has been adopted for all cases so far. In the present paper, the results of the nonshunting procedure were studied from the aspects of the mortality, accumulated survival rate, endoscopic findings of esophageal varices, rebleeding and rehabilitation to social life.

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## MATERIALS AND METHODS

The number of operations for portal hypertension performed in our institute for the period from January 1973 through December 1981 was 68.

The basic disease included 58 cases of liver cirrhosis (LC) and 10 cases of idiopathic portal

hypertension (IPH). There were thirty five male patients (aged 29 to 76 years, the mean being 49.3 years) and 23 female patients (aged 30 to 72 years, the mean being 52.9 years) suffering from LC, while all patients with IPH were females, aged from 28 to 59 years, with the mean of 39.8 years.

Table 1 shows the surgical procedures and

**Table 1.** Surgical procedures and the time for surgery

Method of operation	Emergency operation	Elective operation	Prophylactic operation	Total
Sugiura's procedure	5	13	8	26
Esophageal transection	5	8	2	15
Hassab's operation	3	10	14	27
Total	13	31	24	68

the time for surgery, and it has been noted in recent years that the number of emergency operations has been decreasing against the increasing ratio of prophylactic operations.

The Tokyo-University-Second-Surgery method is the one reported by Sugiura<sup>9)</sup>, in which surgery is made in accordance with paraesophago-gastric devascularization, transthoracic esophageal transection, splenectomy, selective vagotomy and pyloroplasty. The range of the devascularization in the middle esophagus should, in principle, be made up to the upper periphery of the inferior pulmonary vein. Esophageal transection should be made at a region four to five cm from the cardia, and the node suture of 60 to 70 stiches should be made with the atraumatic needle (with Dexon thread).

Hereafter, those cases where only the thoracic procedure of Sugiura's method, i. e. only trans-

thoracic esophageal transection and the devascularization in the middle and lower esophagus, will be referred to as esophageal transection, and those where only the abdominal procedure was performed, as Hassab's operation<sup>9)</sup>.

## RESULTS

Table 2 shows the relation between Child's classification<sup>1)</sup> and mortality classified by the formula. The mortality classified by the formula was 7.7% by Sugiura's method, 13.3% by esophageal transection, and 18.5% by Hassab's operation. The mortality by Child's classification was 0/13 (0%) of Child A, 4/14 (9.8%) of Child B, and 5/14 (35.7%) of Child C. Table 3 shows the relation between the formula and the cause of death in nine cases of operative death.

The follow-up survey conducted in December 1981 could find out the situations of all cases.

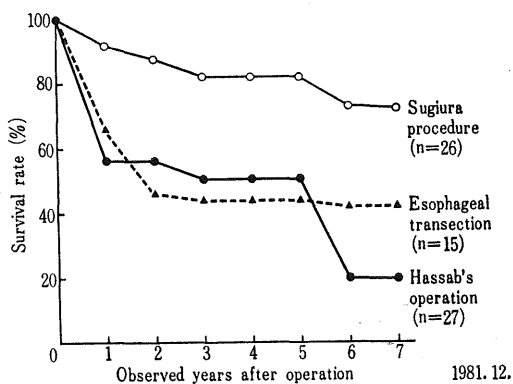
**Table 2.** Operative mortality classified by Child

Method of operation	Child's classification	No. of case	No. of death	Mortality
Sugiura's procedure	A	3	0	2/26 ( 7.7%)
	B	20	2	
	C	3	0	
Esophageal transection	A	2	0	2/15 (13.3%)
	B	8	0	
	C	5	2	
Hassab's operation	A	8	0	5/27 (18.5%)
	B	13	2	
	C	6	3	

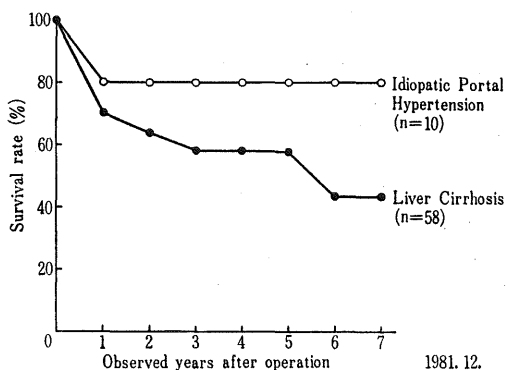
**Table 3.** Cause of operative death

Case	Age	Sex	Liver Biopsy	Time of Operation	Method of operation	Cause of death
1	52	M	LC	Elective	Sugiura's procedure	Empyema, GIB
2	50	F	LC	Prophylactic	Sugiura's procedure	GIB
3	76	M	LC	Elective	Esophageal transection	Empyema
4	56	F	LC	Emergency	Esophageal transection	Empyema, GIB
5	59	F	IPH	Emergency	Hassab's operation	Peritonitis, Hepatic failure
6	49	M	LC	Emergency	Hassab's operation	GIB
7	53	M	LC	Elective	Hassab's operation	GIB
8	56	F	LC	Elective	Hassab's operation	GIB
9	51	F	LC	Elective	Hassab's operation	Pneumonia

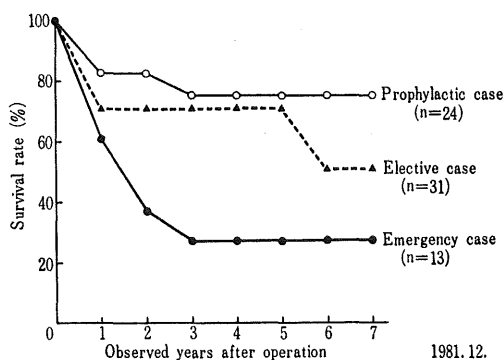
LC: Liver cirrhosis  
 IPH: Idiopathic portal hypertension  
 GIB: Gastrointestinal bleeding



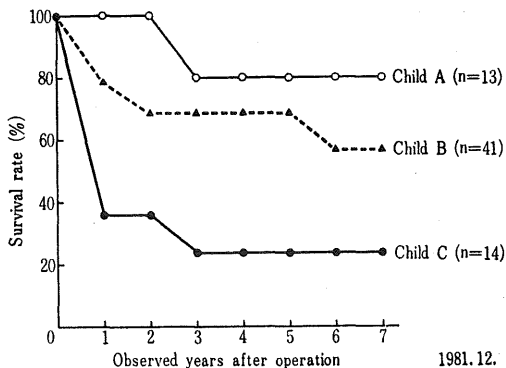
**Fig. 1.** Accumulated survival rate, classified by method of operation.



**Fig. 3.** Accumulated survival rate, classified by the basic disease.



**Fig. 2.** Accumulated survival rate, classified by the time of operation.



**Fig. 4.** Accumulated survival rate, classified by Child.

Accordingly, the accumulated survival rate was calculated with the Cutler's method<sup>20</sup>. Fig. 1 shows the results classified by the formula, Fig. 2, classified by the time of operation, Fig. 3, classified by the basic disease, and Fig. 4, classified by Child. The subjects of our survey included seventeen cases of late death, comp-

rising 9 of hepatic failure, 2 of hepatoma, 2 of bleeding, 3 of other diseases, and 1 unknown cause. The number of patients whose prognosis was under our observation was counted 42, including 1 under treatment in hospital (2.4%), 2 under treatment at home (4.8%) and 39 already rehabilitated to social activity (92.8%).

**Table 4.** Postoperative situations of varices in cases where endoscopic inspections were performed

Method of operation	No. of case	Endoscopic findings on varices		
		Disappearance	Improvement	No change
Sugiura's procedure	20	11 (55%)	9 (45%)	0 (0%)
Esophageal transection	13	4 (31%)	8 (62%)	1 (7%)
Hassab's operation	17	5 (29%)	9 (53%)	3 (18%)

Table 4 shows the situations of improvement and disappearance of varices in 50 cases where endoscopic inspections were performed preoperatively and postoperatively. The greatest effect on varices was found with Sugiura's method.

Recurrence of bleeding was found in one case of esophageal transection (6.7%), in one case of Hassab's operation (3.7%), and none after Sugiura's method.

## DISCUSSION

Our therapeutic principles for portal hypertension are presented in the beginning of this paper. Because Walker's simple esophageal transection technique<sup>9</sup> is associated with a high risk of rebleeding, we adopted transthoracic esophageal transection along with the paraesophageal devascularization, i. e. the intrathoracic procedure of Sugiura's method<sup>8</sup>. Hassab's operation, i. e. the intraperitoneal procedure of Sugiura's method, has been conducted for the residual varices. In recent years, however, with the improvement of the conservative hemostatic method and development of such therapies as the endoscopic sclerotherapy<sup>5</sup> or percutaneous transhepatic obliteration (PTO)<sup>7</sup>, the number of emergency operations has been decreasing gradually.

As with emergency cases, Sugiura's intrathoracic procedure, followed by the intraperitoneal procedure as a second stage, was adopted in preference for patients of advanced age and for

those with severe liver impairment. Inversely, for severe gastric varices, Hassab's operation was given in preference.

When deciding the indications for prophylactic operations, the most important point is to predict the danger of variceal rupture, and we are of an opinion that the decision be made according to the presence or non-presence of the redcolor sign on the variceal surface (R-C sign) explained in "The General Rules for Recording Endoscopic Findings on Esophageal Varices" compiled by Japanese Research Society for Portal Hypertension<sup>4</sup>. For those cases where the R-C sign was noted, Sugiura's method has been given positively. However, when a prophylactic operation is to be given, it is suggested that the safety for the operation must be assured, also the effectiveness of the technique on the varices must be sufficient, with a low recurrence rate of bleeding. Because, the safety and effectiveness of the endoscopic sclerotherapy and PTO have been improving, the criteria for prophylactic operations have been getting more selective.

In the present paper, the authors have examined retrospectively the outcome of our non-shunting procedures performed so far under these therapeutic principles. Although the mortality in all cases was 13.2%, it was as low as 7.7% with Sugiura's method, while the mortality of esophageal transection was 13.3% and of Hassab's operation, 18.5%. Many of deaths

occurred in emergency cases or those who were poor operative risks, and the rate has been declining recently. The mortality by Child's classification proved that Child A was 0%, Child B, 9.8%, and Child C, 35.7%, with Child C the poorest outcome. It is quite natural to mention that the difference of surgical formulas should be taken into consideration but Child's classification can be an index for the decision of the indications for operations for portal hypertension.

The causes of death of nine cases were mostly hepatic failure and gastrointestinal bleeding (GIB) at an early stage after operation. Autopsy revealed that the cases of GIB were attributable to oft-occurring erosion or shallow ulcers, the so-called "acute gastric mucosal lesion (AGML)". Since GIB occurred in high incidence in the cases complicated with paragastric devascularization, GIB at an early stage after operation has been decreasing recently by the preventive administration of H<sub>2</sub> blockers and other drugs.

As reviewed from the accumulated survival rate, Sugiura's method among all formulas, proved best, with the five-year-survival rate reaching as high as 82%. However, the outcome of esophageal transection and Hassab's operation was poorer than that of Sugiura's method, both following a similar development until five years after operation. It should be pointed out, however, that the results are not only attributable to the difference of surgical formulas, but also to the fact that the cases on which Sugiura's method was given were mostly those at lower risk. As classified by the time of operation, the outcome of emergency operations was particularly poor, with only a 26% three-year-survival rate. Even taking into consideration that emergency operations included many high-risk cases, the accumulated survival

rate was very poor. It is suggested from these facts that emergency operations should be avoided as much as possible. Another point to ponder is the fact that the accumulated survival rate of prophylactic operations was almost similar with that of the elective operations until five years after operation. As classified by the basic disease, the outcome of IPH was better than that of LC, because the degree of liver impairments in the former was milder, and varices were likewise milder. The accumulated survival rate by Child's classification exhibited a difference among Child A, B, and C, and the usefulness of Child's classification for the standard for the indication for operations was recognized, similarly with the relation between Child's classification and the mortality. Considering the cases in which long-term follow-up has been possible, there is one case (2.4%) which is in the hospital for further treatment, two cases (4.8%) under treatment at home, and as many as 39 cases (92.8%) already rehabilitated for social activity, so the results are rather satisfactory. Because the causes of remote death were mainly liver impairment including hepatic failure and hepatoma. Therefore, strict long-term followup is required for all patients.

The effect of Sugiura's method for varices with endoscopy was good, but the effect by esophageal transection and Hassab's operation was not fully satisfactory, which was reflected in the recurrence rate of bleeding.

Table 5 shows the results of comparison of our nonshunting procedure, other nonshunting procedure so far reported, Sugiura's procedure, Yamamoto et al.'s<sup>10)</sup> terminal esophagoproximal gastrectomy, and Koyama et al.'s<sup>6)</sup> esophageal transection. The report of Sugiura et al. contained the best results in terms of the mortality, five-year-survival rate, and the recurrence rate

Table 5. Comparison of nonshunting procedure

Reporter	Method of operation	No. of case	Operative mortality	5 year survival rate	Recurrence of bleeding
Sugiura <sup>9)</sup> , 1977.	Sugiura's procedure	276	4.3%	83%	1.5%
Yamamoto <sup>10)</sup> , 1976.	Terminal esophgoproximal gastrectomy	112	11 %	65%	8 %
Koyama <sup>6)</sup> , 1980.	Esophageal transection	100	11 %	55%	6 %
Kodama, 1982.	Total case	68	13 %	62%	3 %
	(Sugiura's procedure)	(26)	( 8 %)	(82%)	(0 %)

of bleeding, but the authors would like to consider that there is not much difference between other reports and ours, and that our outcome is not unsatisfactory.

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