

Primary prevention and management of variceal bleeding: Review of Historical Evidence

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Abstract:

Background:

Prevention and control of active bleeding caused by portal hypertension is still a challenge. Surgery used to be the only option in the earlier days, but now many options exist. Choice of the correct mode of treatment is important and is determined by many factors dictated by the condition of each patient and the available experience.

Methods:

Publications written on the primary prevention and the management of acute bleeding are selected by Internet search. The strength of evidence of each publication is determined using a defined classification method. The advice given is based on the available evidence.

Results:

Seventy-two publications were retrieved. The level of evidence for each publication is given in the reference section.

Conclusion:

Surgery should not be done for primary prophylaxis. For the control of acute bleeding surgery is preferred for Childs-Pough class A and B. For class C the procedure of choice is TIPS.

Key words: sclerotherapy, band ligation, portal hypertension.



Whipple popularized a surgical solution to the problem of bleeding in portal hypertension in the 1940s¹. Since that time many surgical operations were developed in the quest for better results. No perfect operation was ever found. For this reason, other types of solutions came successively into play. Pharmacotherapy, endoscopic therapy, liver transplantation and lastly TIPS have all joined the armamentarium. All these treatment modalities are now used in the developed world, each with a different indication. The deficient infrastructure of the hospitals and lack of expertise shorten the list of alternatives in the developing world.

Objectives:

The objectives of this review are:

1- To determine the shareholding of each treatment modality in the primary prevention and management of bleeding caused by portal hypertension.

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2- To determine the need for surgery in the primary prevention and management of acute bleeding that is supported by evidence.

Methods:

- The Internet was searched using the words: portal hypertension, treatment, surgery, operations, management, meta-analysis, variceal bleeding, in different combinations.

- The search was done through the following search engines:

a) PubMed through HINARI (a WHO site with free access to most journals). This is searched by two means:

1. The general PubMed searching bar.
2. MeSh Database by MeSh terms.

b) The Cochrane Review site.

c) Google general searching bar.

d) Yahoo general searching bar.

Selected references from publications found by the primary search were retrieved by a secondary search using the above search strategy.

Selection of papers:

- No time limit.

- Language: English only.

- All types of research are included e.g. meta-analysis, controlled trials, case studies, narrative reviews, etc..
- Publications with full text or abstract available on the Internet are included.
- Some publications thought to be important for the review could not be retrieved. Some because they are written in a language other than English, with no English abstract, but others simply could not be found by the search methods applied.

Strength of evidence:

The strength of evidence is divided into levels taking into consideration the available grading systems^{2,3,4}.

Level 1: Meta-analysis of randomized trials.

Level 2: Randomized trials.

Level 3: Non randomized, controlled trials, well written qualitative reviews dealing with mixed trials, case control studies. Comparative studies.

Level 4: Case studies.

Level 5: Expert opinion. These include personal contacts of experts, editorials and published comments in respected journals.

Results:

Sixty nine publications are included in this review.

Introduction:

The incidence of gastroesophageal varices in patients with a history of schistosomiasis is not known, but in cirrhotic patients is around 50%⁵. Bleeding from these varices is caused by the increase in portal venous pressure that is directly related to the degree of outflow resistance and the portal venous inflow⁶.

The risk factors that point to the possibility of variceal bleeding are:

- Portal pressure above 12 mm Hg.
- Varix size and location. The potential bleeders are mainly those of the oesophagus and the stomach, other locations (retroperitoneal, anal canal etc.) rarely bleed.
- Variceal appearance on endoscopy (red sign).
- Degree of liver damage; Child-Pugh class C cirrhosis.
- Presence of tense ascites.

The roadmap of treatment:

Surgical treatment was tried since 1929 in Mayo Clinic⁷ and in 1939 Crafoord and

Frenckner wrote about a new treatment for varicose veins of the oesophagus⁸. During the 1930s other treatment options were restricted to balloon tamponade and rigid endoscopic sclerotherapy⁵.

In 1945 Whipple introduced the total portacaval shunt operation¹ which proved to be more acceptable and gave a better control of the bleeding problem which was the main reason for treatment. Since then surgery becomes the major treatment option for bleeding portal hypertension. All through that decade, the 1950s and until the middle of 1960s these operations continued to be used in spite of the high incidence of encephalopathy⁹. The perfect control of bleeding followed by severe encephalopathy made the total shunt operations unacceptable¹⁰ and another operation had to be found.

In 1967 Warren introduced the distal splenorenal shunt (DSRS) which is a selective shunt¹¹. This operation showed great success¹² that the result of any other mode of treatment which was introduced thereafter had to be compared to it¹³. Although Starzel started liver transplantation in 1963¹⁴, it was suggested as a treatment for bleeding esophageal varices in 1988¹⁵. During the period of the seventies and early 80s a great leap had occurred in the endoscopic treatment of varices. Thanks to Hopkins and Kapany¹⁶ who in 1954 introduced the flexible fiberscope which was utilized by Hirschowitz for gastroscopy and demonstrated its use in 1957¹⁷. In 1961 Hirschowitz published his use of the new fiberscope¹⁸ for gastroduodenoscopy. This important progress in endoscopy has led to its efficient use in flexible endoscopic sclerotherapy and banding of the gastro-oesophageal varices in the 1970s and onwards¹⁹. It will prove later to be the greatest shareholder of the treatment of bleeding in portal hypertension²⁰.

The unsatisfactory results of (DSRS) in patients with deteriorated liver function lead the radiologists to introduce in the 1990s a non-surgical shunt, Transjugular Intrahepatic Porto-systemic Shunt (TIPS) - as a salvage procedure for this category of patients. This procedure proved to be a strong competitor of

(DSRS)²¹.

The foregoing summary showed the ever-decreasing share of surgery in the treatment of bleeding in portal hypertension. Does it still hold a place in the armamentarium?

Analysis of the present status:

Management of portal hypertension with varices is done in the following steps:

1- Prevention of the first bleed. The primary prophylaxis.

2- Treatment of active bleeding.

3- Prevention of recurrence of bleeding. The secondary prophylaxis.

4- Treatment of the underlying cause.

In this review, the share of different treatment modalities and the place of surgery in the first two steps will be determined by analyzing the available evidence.

1- Prevention of the first bleed (primary prophylaxis).

Ten papers were identified that deal with primary surgical prophylaxis^{9,10,22-29}. The first four were early papers written before the availability of the non-surgical primary prophylactic options. The fifth and ninth include meta-analysis of these papers^{24,28}. The Japanese randomized a trial evaluating primary surgical prophylaxis²⁵ and the other three papers are qualitative reviews.

Surgery for portal hypertension was introduced to solve the problem of bleeding after the occurrence of the first bleed. When the results of the total shunt operations were published^{9,10,22,23}, use of surgery for primary prophylaxis appeared to be inappropriate²⁷⁻²⁹. After the Warren shunt was introduced in 1967¹¹ it proved to be a better alternative. A new hope to use the new operation for primary prophylaxis was revived. In 1980 the Japanese Research Society for Portal Hypertension started a prospective randomized controlled trial to evaluate primary surgical prophylaxis. They evaluated selective shunts and no shunting interruption procedures in patients who had portal hypertension but did not bleed. They reported their results in 1990²⁵. They concluded that "portal nondecompression surgery was effective in preventing the variceal bleeding and in improving survival". They did not compare their results of surgery to non-

surgical options for primary prophylaxis. Their control group received none of the newer treatments which became available at that time. Non-surgical primary prophylaxis became available during the 1980s with the introduction of flexible endoscopic sclerotherapy and banding, the β -blockade was added later in the decade. When the results of surgery were compared to these treatment modalities a general agreement between different researchers was that surgery should not be done for primary prophylaxis^{24,26-29}. It is important to note that all these reviews use the same early studies of portacaval shunts^{9,10,22,23}. No randomized controlled trials evaluating selective shunts and devascularization procedures could be found on the Internet except the Japanese study²⁵.

Although some advocate the use of beta-blockers for primary prophylaxis^{24, 26, 28-31}, there is still no consensus about this^{24,32}. Other researchers claim that band ligation is superior to beta-blockers^{32,33} while a third group found the results to be equal^{34,35}. The common rule is that when there is a contraindication to beta-blockers or the development of side-effects, band ligation should be substituted. Injection sclerotherapy for primary prophylaxis was not found to be of benefit^{28,31,36,37}.

No surgery for primary prophylaxis: level of evidence is 1.

2- Emergency treatment of active bleeding.

Balloon tamponade was the only other practical alternative beside surgery to control the acute episode of bleeding from the varices up to 1950⁵. During the 1950s vasopressin was introduced as a medical means of decreasing the portal blood pressure to control the bleeding. Both these modes of treatments were temporary measures that buy time to improve the condition of the patient for surgery which was the only definitive treatment. During the 1970s and 80s sclerotherapy became more effective and variceal banding was introduced. Their availability, relative ease and success in controlling the active bleeding in more than 80% of the cases⁵ make urgent surgery rarely indicated. In those cases where control of

bleeding is not possible, resort to surgery is still needed. These patients are usually those with bad liver function, Childs-Pough class C and/or those complicated by other co-morbidities who deteriorate more by the repeated, unsuccessful, non-surgical attempts at control. The surgical mortality, in these patients, is exceeding 80%⁵.

In the 1990s radiologists introduced TIPS to rescue the failures of non surgical treatments specially those with bad liver functions. This again pushed surgery further back. Taking into account all the available treatment modalities the question now is this: is there any evidence-based reason for urgent surgery to control bleeding in portal hypertension? To answer this question each of the treatment modalities will be considered to see if surgery is still needed.

Pharmacological control of active bleeding:

Drugs that lead to decrease in portal pressure should be administered to every patient as soon as possible³⁸. Some advocate their pre-hospital use by the emergency team while driving the patient to hospital³⁹. Its use had been proved to decrease the duration of hypotension and the need for blood transfusion⁴⁰. Even if the bleeding stops spontaneously, it is advisable to give these drugs. If the bleeding is active, balloon tamponade is applied as an addition to drugs while awaiting emergency endoscopic therapy. It is estimated that bleeding will recur in 40-60% of the patients treated in this way after an initial control⁴¹ and the mortality from the recurrence of bleeding approaches 90% in patients of Child's-Pough grade C⁴². There is no means available to identify these patients who will rebleed. For this reason endoscopic sclerotherapy or band ligation has to be done for every patient as soon as possible during the same hospital admission even if the bleeding is controlled by these measures⁴¹. As will be seen later, endoscopic treatment will control bleeding in up to 90-95% of the cases which give it an advantage of more than 30% over drugs for acute bleeding.

Endoscopic treatment:

Urgent endoscopy has to be done for every patient presenting with upper GIT bleeding to

know the source of bleeding and to treat it if possible. Endoscopic control of active bleeding varices was evaluated by several researchers.

Emergency endoscopic sclerotherapy:

In mid 1980s researchers from South Africa reported the results of a study⁴³ that should have limited the liberal use of sclerotherapy which used to be repeated several times during the same hospital admission in an attempt to avoid surgery. They reported that up to two injection sessions of sclerotherapy for the same bleeding episode will give definitive control of bleeding in up to 86% of cases with a mortality of 21%. More than two injection sessions will increase the mortality up to 89% in poor risk patients. They concluded that if control of bleeding could not be achieved by two sclerotherapy sessions a third should not be attempted and another mode of treatment should be done. At that time only surgical intervention was available. In 1990 one of the above authors published a review⁴⁴ in which he found that 90-95% of cases could be controlled by sclerotherapy and that surgery is needed only for the remaining 5-10%. Again in 1992 authors from the same institute published a review in which they define sclerotherapy failure as: further variceal bleed after two emergency injection treatments during a single hospital admission. They stick to the previous advise⁴¹ of no more than two endoscopic attempts to control bleeding. It is strange that they did not mention TIPS although it was widely known at that time. Another important finding was reached by Shemesh and colleagues⁴⁵ that early sclerotherapy, within six hours of presentation, is more effective and lead to less mortality and a higher control rate. These four papers are chosen in the beginning because they contain what makes the basic advice:

- 1- Sclerotherapy should be done earlier rather than late to give the best result.
- 2- Sclerotherapy should not be attempted more than twice for the same episode because that will lead to high mortality.
- 3- Sclerotherapy will fail to control bleeding in 5-10% of cases that will need more invasive procedures.

All or some of these conclusions will be repeated in various other researches^{28,38}. However in a meta-analysis⁴⁶ of randomized controlled trials comparing sclerotherapy to various drugs, no convincing evidence was found to support the use of emergency sclerotherapy for variceal bleeding in cirrhosis as the first, single treatment when compared with vasoactive drugs. This result stood in sharp contrast to the result of an earlier randomized controlled study⁴⁷ which concluded that "Sclerotherapy carried out as the first treatment of the active variceal hemorrhage proved both safe and effective, even in the presence of major hemorrhage, and as compared to combined vasopressin and nitroglycerin it proved superior". Terblanche published a review in 1989 in which he recommended emergency sclerotherapy for acute bleeding²⁷. This controversy has led to the idea of combining both therapies to get better results. A meta-analysis of randomized controlled trials⁴⁸ comparing endoscopic control of bleeding alone versus endoscopic control combined with pharmacological means found the combination to be better in initial arrest of bleeding and five day hemostasis, but not in mortality. Another meta-analysis²⁸ of trials that compare endoscopic sclerotherapy to surgery in the control of bleeding refractory to medical treatment showed surgery to be better in control of bleeding but the mortality was the same. In spite of these results surgery is not considered as first line management tool for the following reasons:

1- Endoscopy is usually needed for the diagnosis of the cause of bleeding and its control can start here.

2- Sclerotherapy is easier to learn compared to portal hypertension surgery.

3- Physicians are actively involved in the management of portal hypertension and they will take a larger share when sclerotherapy is considered for control of bleeding before surgery.

But the last of the three basic points of advice above, sclerotherapy will fail to control bleeding in 5-10% of cases, should always be remembered and the surgeon has to be involved earlier before the patient

deteriorates and mortality from surgery becomes prohibitively high.

Emergency endoscopic band ligation:

Band ligation was introduced in 1986 and it rapidly became strong competitor to sclerotherapy. Four review articles⁴⁹⁻⁵² extracting conclusions from randomized controlled trials found that band ligation to be superior to sclerotherapy. However, the latter is still holding place when band ligation is not available. Combination of sclerotherapy or band ligation with drugs is a logical alternative which was found more effective⁴⁸.

All the above non-surgical methods, performed in the best centers, by the most experienced doctors will have up to 10% of the cases unresponsive to them. The descriptions of these 10% of patients who will continue to bleed in spite of all these measures have yet to be determined. Therefore early decision for alternative treatment gives better results than late when the patient becomes in a bad shape.

Summary of some of the above studies is shown in table 1.

Gastropathy & gastric varices

Portal hypertension causes gastropathy and/or gastric varices. Prevention of bleeding from gastropathy is mainly done through pharmacological means. Endoscopic or surgical primary prevention of gastric varices are less well studied than oesophageal varices. Generally both procedures are not recommended in primary prevention.

Treatment of active bleeding from gastropathy cannot be controlled by endoscopic means or ballon tamponade. Pharmacotherapy can decrease the severity of bleeding but the only definitive treatment is surgery or TIPS⁵³. Shunt surgery or oesophagectomy with total gastrectomy controls bleeding but has a high mortality.

For gastric varices all options are available:

Endoscopic treatment:

Two studies assessed the use of 5% ethanolamine oleate. In the first⁵⁴ control of bleeding was achieved in 93% of patients. Re-bleeding rate was 13%

Table1: Sclerotherapy compared to other treatments for acute bleeding.

Author	Year	Re-bleeding (OR 95% CI)	Mortality (OR 95% CI)
Westby ⁴⁶	1989 (RCT)*		
Scl/vas+nitro*		0.91(0.32-2.63)	0.59 (0.21-.70)
D'Amico ²⁹	1995 (metaanalysis)		
scl/vas*		0.66 (0.44-1.00)**	0.97 (0.56-1.65)**
scl/somatostatin*		0.43 (0.14-1.30)**	0.97 (0.56-1.65)**
Laine ⁴⁸	1995 (metaanalysis)		
lig/scl*		0.52 (0.37- 0.74)]	0.67(0.46 - 0.98)

Note:

OR= odd ratio

* RCT = Randomized Controlled Trial, scl = sclerotherapy, vas= vasopressin, nitro= nitroglycerin, lig = band ligation,

** pooled odds ratio

and cumulative mortality after one year was 31%. In the second study⁵⁵ the results were given for lesser curve and fundal varices separately. Control of bleeding was achieved in 54%, 26% and mortality was 7.7%, 41% respectively. In one study⁵⁶ n-butyl-2-cyanoacrylate was used for gastric varices. Acute bleeding was controlled in all cases. Rebleeding occurred in 10.3% and complications related to the procedure occurred in 6.9%. The varices were eradicated in 93.1% of the cases, 69% after only one session.

In one study⁵⁷ 5% ethanolamine oleate was compared to butyl cyanoacrylate. Control of bleeding was 67%, 93%, rebleeding was 30%, 25% and mortality was 67%, 38% respectively. Although the results of these three parameters were better for butyl cyanoacrylate, complications were higher (41%, 46%).

Surgery:

Two studies assessed emergency surgery for gastric varices. Mortality was 50% in the first study⁵⁸. In the living ones varices recurred in all those who were treated with under-running of the bleeders alone but in none when ligation of the left gastric vein was added. In the second study DSRS was performed⁵⁹. Mortality was 6.7%. No rebleeding occurred for two years.

TIPS:

In one study TIPS was used⁶⁰ to control bleeding from gastric varices. Initial haemostasis was achieved in all of them.

Hospital mortality was 25% and early rebleeding was 16.7%. In another study⁶¹ haemostasis was achieved in 90%, early rebleeding was 14% and hospital mortality was 25%.

In a study comparing the use of TIPS for gastric and oesophageal varices⁶² rebleeding rate was 20% and 14.7%, one year cumulative mortality was 30.7% and 38.7% respectively. Looking at table (2) the results are diverse and inconsistent. This is probably due to the extreme heterogeneity of the studies. Added to this is the small number of cases in each study which does not give enough power to make a sound conclusion. The studies in which surgery was done gave 100% initial haemostasis and zero percent rebleeding, but mortality is the highest if the odd result of ethanolamine of 67% mortality is excluded. TIPS gave high control of bleeding but also high mortality and rebleeding rates. A combined result for butyl cyanoacrylate and ethanolamine oleate gives for initial control 96.5%, 64.5%, for mortality 22.4%, 39.2% and for rebleeding 17.2%, 20.4% respectively. This gives a better result for butyl cyanoacrylate.

A reasonable plan for the control of gastric variceal bleeding is to give pharmacotherapy and use balloon tamponade to buy time for endoscopic control with butyl cyanoacrylate. If this fails, then TIPS, if TIPS is not available or fails, then surgery. Selection of surgery depends on local experience.

Table (2) Control of bleeding from gastric varices.

Author	Year	No. of patients	initial control(%)	mortality (%)	re-bleeding (%)	
Kojima ⁵³ (EA)	2005	30	93	31(one years)	13 (one year)	
Gimson ⁵⁴ (EA)	1991	46				
		Lesser curve	13	54	7.7	---
		Fundal	22	26	41	---
Dhiman ⁵⁵ (BC)	2002	29	100	7.0	10.3	
Oho ⁵⁶	1995	(EA)	24	67	67	30
		(BC)	29	93	38	25
Greig ⁵⁷ (under-running of bleeder +or – left gastric vein ligation)	1990	06	100	50	00	
Thomas ⁵⁸ (distal splenorenal shunt)	1994	30	100	6.7	00	
Kuradusenge ⁵⁹ (TIPS)	1993	12	100	25	16.7	
Karl ⁶⁰ (TIPS)	2003	32	90	25	14	
Tripathi ⁶¹ (TIPS)	2002	40	00	30.7 years	20	

EA=Ethanol amine, BC= butyl cyanoacrylate

Emergency Surgery Or TIPS:

A group of researchers summarized⁶³ their fifty years of experience in portal hypertension emergency surgery in the year 2000 by the following:

"At the beginning, many emergency procedures (selective shunts, low-diameter shunts, and devascularizations) were done, with a high mortality rate.

In the 1980s, the mortality was close to 40%. Thus, in the past 10 years, virtually no more emergency procedures have been performed". They treat patients with bad livers by non-surgical means and if these fail they use TIPS. On the other extreme, Orloff and colleagues advocate emergency surgery for all patients⁶⁴. They produced the unparalleled results of less than 20% operative mortality and survival rates of 67% and 57% for 5 and 10 years respectively for consecutive, non-selected patients.

As the ancient Romans say "the best solution is the middle", so let us see if a middle could be found between these two extremes.

Only one meta-analysis is found which was published in 1995²⁸. It discussed the results of early experiences with TIPS till 1992. The

author concluded that in cases refractory to non-surgical measures an emergency portacaval shunt or TIPS should be done, the latter being the best in patients with poor liver function, who shall further be considered for liver transplantation. A study evaluating the use of TIPS in controlling bleeding in portal hypertension was published in 1994⁶⁵ and was not included in the previous meta-analysis. It included 100 patients, 10 were treated on an emergency basis. Three of these ten patients died within 30 days making a hospital mortality of 33.3% from those treated urgently. Thirty-three percent had shunt stenosis or occlusion and 11% had rebleeding. These numbers were from the total and those from the ones treated on emergency basis were not given separately. Another study, also published in 1994 and not included in the meta-analysis, in which 20 patients were treated with TIPS, on an emergency basis, when non-surgical methods failed⁶⁶. Twelve of them died of hepatic failure and sepsis within 40 days, making a mortality of 60%. Thirty percent had rebleeding within five days. Another two had late rebleeding due to occlusion of TIPS and ultimately a portacaval shunt was done for them.

In 1996 Sanyal⁶ and colleagues published a study of using TIPS semi-urgently in patients unresponsive to non-surgical treatment with advanced age, sepsis, renal or pulmonary compromise, or other comorbid diseases. These patients were assessed and found unsuitable for portacaval shunt. Their 35-day mortality rate was 40%, early rebleeding of less than 7%. These patients, due to their severe conditions, were destined not to live for long. Six months later only 46% of them were alive.

Three studies comparing urgent TIPS to urgent surgery were retrieved. One randomized trial⁶⁷ compared small-diameter prosthetic H-graft portacaval shunts to TIPS. They had total failure for TIPS to be 57% and for H-graft to be 26%. The authors concluded that "TIPS resulted in more deaths, more rebleeding, and more than twice the treatment failures". They vote against TIPS. The same authors in a continuation of the same study published in 2001⁶⁸ wrote "Despite vigilance in monitoring shunt patency, TIPS provides less optimal outcomes than H-graft portacaval shunt for patients with portal hypertension and variceal bleeding".

The other was a non-randomized study⁶⁹ which compared TIPS with oesophageal transection that were done on an urgent basis. Seven of the 18 patients planned for transection were found unfit. The 30-day mortality in this group was 79%, and the rebleeding was 26.2%. In the TIPS group the 30-day mortality was 42% and the rebleeding was 15.6%. In only two patients of the TIPS the shunt could not be placed. Jalan and colleagues reviewed the evidence-based place of TIPS in the 1990s⁷⁰ and recommended that TIPS should be used as a salvage procedure after failure of two endoscopic sessions. They did not bring the issue of the Childs-Pough class into the making of this decision. Although Rikkers⁷¹ and colleagues did not consider Childs-Pough class C as a contraindication to emergency surgery, they consider TIPS more appropriate as these patients will die from hepatic failure before TIPS occlusion develops if liver transplantation is not done. They recommended selective shunt surgery for

class A and B for its long term advantage over TIPS. Their operative mortality rate after emergency non-selective shunt was 41%. Childs-Pough class C made 64% of their 22 patients. In distal-splenorenal shunt their operative mortality was 10% in twenty patients in whom 35% were class C. Modified Sugiura procedure was done for nine unshuntable patients with a hospital mortality of 33% and rebleeding in two patients (22.2%).

Emergency oesophageal transection was evaluated in two studies. In one of them transection was done for 30 patients⁷². The 30-day mortality for class A was 0%, for class B was 16.7% and in class C was 81.8% and the overall mortality was 63%. 21 of the 22 patients with class C died within one year. They concluded that oesophageal transection is effective at stopping variceal bleeding but does not modify the underlying disease; therefore such patients may benefit more from an intrahepatic portasystemic stent shunt while awaiting liver transplantation. In the other study⁷³ operative mortality was nil for patients with extrahepatic obstruction and normal liver function, and was 53% for patients with cirrhosis.

Modified Hassab operation was assessed in one study⁷⁴ in which oesophageal transection was not done. They reported a zero operative mortality and 23% rebleeding rate. In this study gastric varices disappeared in all patients and oesophageal varices in 62% of them.

The most recent study that is retrieved was published in February 2007⁷⁵. It evaluated the emergency shunt and devascularization procedures undertaken when non-surgical methods fail to control bleeding. Mortality and rebleeding being the main outcome measures 82 patients were included in the study. The hospital mortality among cirrhotics was 22% and non-cirrhotics 8%. In cirrhotic patients the mortality in class A was 11%, B was 20% and C was 31%. Mortality after devascularization was 20% and after shunt surgery was 6%. Primary failure to control bleeding occurred in three patients of devascularization (6%) and one patient in the shunted group (3%).

The last four papers^{5, 38, 42, 76} retrieved were qualitative reviews that were published along the way since the introduction of TIPS. They discussed papers that were published comparing TIPS and surgery. All of them reached a conclusion that the use of TIPS is preferred in emergency situations especially in patients with poor liver function, except Michael Henderson⁵ and colleagues who were still asking for more evidence for the jury to decide. Their publication was the most recent one among the four. Summary of the above studies is given in tables (3) and (4).

Table3: Mortality and rebleeding after emergency surgery.

Author	Year	No	OM	RB
Orloff ⁶³	1994	43	19	NA
Rikkers ⁷¹	1994	51	27.5	NA
Jalan ⁶⁹	1995	19	79	26.6
Wu YK ⁷⁴	2002	15	00	23
Willson ⁷²	2005	30	63	33
Sharma ⁷⁵	2007	82	15	21
Total			28.33	24.65

OM=Operative mortality

RB= Re-bleeding

Table4: Mortality and rebleeding after emergency TIPS.

Author	Year	No	OM	RB
McCormick ⁶⁵	1994	20	20	30
Rossle ⁶⁴	1994	10	33	NA
Jalan ⁶⁹	1995	19	42	15.6
Sanyal ⁶	1996	30	40	6.7
Total			34	15.9

OM=Operative mortality

RB= Re-bleeding

For practical and ethical reasons randomization and control in such situation is not possible. What makes interpretation and comparison of these studies even more difficult is the following:

- 1- Time from the start of the bleeding to surgery or TIPS application was not uniform.
- 2- Whether the patient had received two or more endoscopy trials sometimes was not mentioned.
- 3- Childs-Pough class distribution in some studies was not mentioned. Even when mentioned the results of each class was sometimes not given separately, especially for class C.
- 4- Mortality was given after various periods: thirty-five days, forty days, six

weeks, and some stick to the known 30-day hospital mortality. I wonder why such an easy, useful agreement is not adhered to!

The presence of a protocol for receiving and managing such patients is very important. It shortens the time-to-act which is very important when large volumes of blood are being lost. It is taken for granted that the place in which these studies were carried is well equipped, has plenty of resources and enthusiastic staff, but is it everywhere!

The combined operative mortality of all studies, tables (3) and (4), shows that the results of emergency surgery are better than TIPS (28.33/34). The rebleeding rate when combined is better in TIPS (24.65/15.9). The general comment that is repeated by most authors is this:

Patients with poor liver function, Childs-Pough class C, or those with co-morbid conditions like renal failure, severe sepsis, uncontrollable ascitis or aspiration, who fail to respond to non-surgical means, should have TIPS for the following reasons:

- TIPS is done without general anesthesia in almost all patients.
- TIPS hospital mortality for Childs-Pough class C is lower than most surgeries.
- The patients have short life expectancy and will die anyway of liver failure if liver transplantation is not done soon.

Surgery is preferred in patients with good liver function that are expected to live longer. Probably the reason to prefer surgery is the long-term problems of TIPS. It needs repeated checks and dilatation for occlusion. Unless new forms of stents are found, that are resistant to occlusion, surgery will continue to be the best bet. Selective shunts are the preferred type of surgery as explained by Livingstone and colleagues¹² "Avoiding TIPS or other complete shunts in patients with stable disease must be stressed because complete shunts will result in hepatocellular failure over a period of a few years, eventuating in a liver transplantation or the patient's death"

The problem of cost in the long term is also against TIPS. In a study comparing the cost of TIPS and surgery⁷⁷ the authors concluded that "The routine ultrasound follow-up of TIPS

and the incidence of dysfunction are the key elements that make TIPS a more expensive option in patients with long survival, such as Child's class A cirrhosis patients".

The middle point between the two extremes of all-surgery and no-surgery could be:

a) *Surgery for Childs-Pough class A and B.*

The type of surgery depends on the local experience.

Level of evidence is 3.

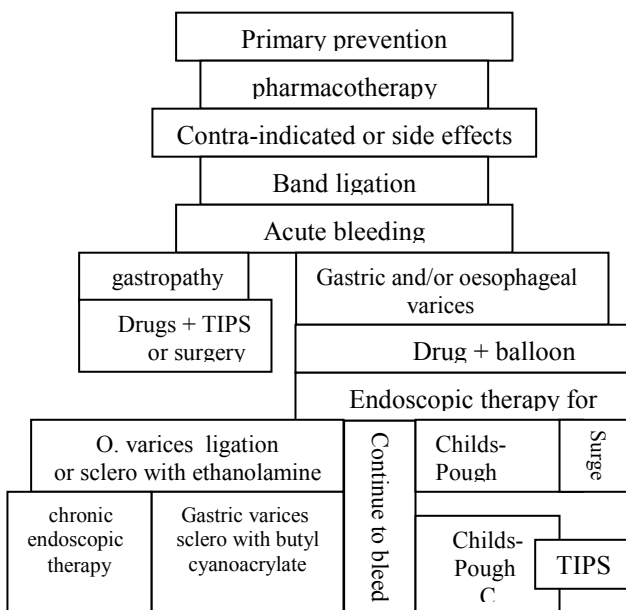
b) *TIPS for Childs-Pough class C and those from class A and B with severe co-morbid conditions. Level of evidence is 2.*

Elmasry⁷⁸ concluded that portal hypertension is a multidisciplinary problem in which portal non-decompressive surgery forms one arm. Other arms are pharmacotherapy, endoscopic therapy, TIPS and liver transplantation.

"Surgery or TIPS?" cries the Patient. That is the Question!

But, choice is not the only problem. TIPS is not available everywhere and the breed of experienced surgeons is on the brink of extinction. Michael Henderson exclaimed during the discussion of the paper presented to the American Southern Surgical Association by Livingstone and colleagues⁷⁸ in 2006" Who is going to do the shunts? Are there any shunters still out there?"

Fig(1) Algorithm of the primary prevention and management of bleeding in portal hypertension



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