Endoscopic treatment of variceal upper gastrointestinal bleeding: European Society of Gastrointestinal Endoscopy (ESGE) Cascade Guideline

Authors
John Gásdal Karstensen1,2, Alanna Ebigbo3, Purnima Bhat4, Mario Dinis-Ribeiro5,6, Ian Gralnek7, Claire Guy8, Olivier Le Moine9, Peter Vilmann10, Giulio Antonelli11, Uche Ijoma12, Gideon Anigbo13, Mary Afiheni14, Babatunde Duduyemi15, Hailemichael Desalegn16, Roberto De Franchis17, Thierry Ponchon18, Cesare Hassan19, Lars Aabakken20

Institutions
1 Hvidovre Hospital – Gastro Unit, Hvidovre, Denmark
2 University of Copenhagen – Department of Clinical Medicine, Copenhagen, Denmark
3 Central Clinic of Augsburg – Gastroenterology, Augsburg, Germany
4 ANU Medical School/Canberra Hospital – Gastroenterology, Garran, Australia
5 Instituto Português de Oncologia – Gastroenterologia, Porto, Portugal
6 Porto Faculty of Medicine – Biostatistics and Medical Informatics, Porto, Portugal
7 Emek Medical Center – Gastroenterology and Hepatology, Afula, Northern Israel
8 European Society of Gastrointestinal Endoscopy – Munich, Germany
9 Hopital Erasme, Université Libre de Bruxelles – Department of Gastroenterology Brussels, Belgium
10 Copenhagen University Hospital Herlev – Gastro Unit, Herlev, Denmark
11 Azienda Ospedaliera Sant’Andrea – Sapienza University of Rome, Digestive and Liver Disease Unit, Rome, Italy
12 University of Nigeria Teaching Hospital – Department of Gastroenterology, Enugu, Nigeria
13 Enugu State University Teaching Hospital – Department of Medicine, Enugu, Nigeria
14 Kwame Nkrumah University of Science and Technology – Department of Pathology, Kusami, Ghana
15 Kwame Nkrumah University of Science and Technology – Department of Pathology, Kusami, Ghana
16 St. Paul’s Hospital Millenium Medical College – Department of Internal Medicine, Addis Ababa, Addis Ababa, Ethiopia
17 University of Milan, IRCCS Maggiore Policlinico Hospital – Department of Internal Medicine Gastroenterology and Digestive Endoscopy Service, Milan, Italy
18 Edouard Herriot Hospital – Hepatogastroenterology, Lyon, France
19 ONRM Hospital – Gastro, Rome, Italy
20 Dept of transplantation medicine, Oslo University Hospital – Rikshospitalet, Oslo, Norway and Faculty of Medicine, University of Oslo, Norway

submitted 19.5.2020
accepted after revision 21.5.2020

Bibliography
DOI https://doi.org/10.1055/a-1187-1154 | Endoscopy International Open 2020; 08: E990–E997
© Georg Thieme Verlag KG Stuttgart · New York
eISSN 2196-9736

Corresponding author
Cesare Hassan, ONRM Hospital – Gastro, Via Morosini 30, Rome 00153, Italy
Fax: +390658446533
cesareh@hotmail.com
Introduction

Patients with variceal gastrointestinal bleeding are encountered daily in endoscopic departments around the world. Risk factors include infectious diseases such as hepatitis B and C virus and schistosomiasis, as well as alcohol consumption and metabolic syndrome with development of nonalcoholic fatty liver disease [1]. Globally, prevalence and incidence of chronic liver disease and cirrhosis vary markedly between countries [2]. High-quality epidemiological data from the majority of African countries are lacking; nevertheless, development of cirrhosis and related consequences are a major burden for public health systems in the continent [2–4]. In Africa, mortality from cirrhosis is estimated at 12.9 to 24.2 per 100,000 person-years range and prevalence of hepatitis B virus is among the highest in the world at 6,100 per 100,000 inhabitants [5, 6].

The latest update of the Baveno guideline describes in detail how to prevent and manage variceal bleeding, as well as how to avoid recurrent bleeding [7]. The majority of recommendations in the guideline are based on high levels of evidence and many years of practice. However, some of the recommendations are resource-sensitive and may be unavailable in low-resource settings due to factors such as extensive costs, lack of sufficient health professional training and logistical limitations.

The European Society of Gastrointestinal Endoscopy (ESGE) has implemented a cascade methodology in a joint effort with the World Endoscopy Organization (WEO), aiming to adapt existing guidelines to make them applicable to resource-limited regions (including some African countries) [8]. Previously, two cascade guidelines have been published focusing on endoscopic management of non-variceal upper gastrointestinal bleeding and upper gastrointestinal obstruction, respectively [8–10]. This ESGE cascade guideline aims to standardize endoscopic management of patients with variceal gastrointestinal bleeding.

Methods

The methodology of the cascade guidelines has been described in the ESGE position paper [8]. Briefly, endoscopy-related statements from the Baveno VI guideline were extracted after agreement with the European Association for the Study of Liver [7]. Following that step, members of the International Affairs Working Group (IAWG) independently categorized the statements as resource-sensitive or not. Those with an agreement of 50% or more for being resource-sensitive were selected for the revision process and subsequently, adaptions were suggested for the four previously defined resource levels (►Table 1) [8]. The selection of statements, as well as the adaption process, was guided by an external panel of five colleagues from Nigeria, Ghana, and Ethiopia, as well as collaborating WEO outreach committee members.

The modified statements were then subject to a Delphi process with local doctors invited by a dedicated mailing list representative of gastroenterology specialists in different areas of Africa, where a rate of agreement of 75% or higher of all adaptions for all resource levels led to acceptance of the cascade statement [11]. If a 75% agreement was not reached, the statement was subject to another round of modification before a final Delphi process was carried out.

Results

Cascade statements

Statement selection: 50 of 199 statements from the original BAVENO VI guideline were selected as resource-sensitive. Three adapted cascade statements – one for each level, excluding the IV as corresponding to the original guideline – were created for each of the original recommendations, making a total of 150 adapted cascade guideline statements.

Delphi process: Overall, 205 experts showed an interest in participating in the Delphi process. Finally, 38 experts from 16 countries participated in the Delphi process, expressing their degree of agreement with one or more recommendations. Details of the participants are provided in ►Table 2. A ≥75% agreement was achieved for 49 of 50 proposed adaptions.

| ▶Table 1 Level of treatment care. |
|----------------------------------|
| I: Basic                         |
| Core resources or fundamental services absolutely necessary for an endoscopy care system to function. By definition, a health care system lacking any basic level resource would be unable to provide endoscopic service to its patient population. It includes diagnostic procedures (gastroscopy and colonoscopy) as well and fundamental monitoring abilities (blood pressure, basic blood biochemistry). |
| II: Limited                     |
| Second-tier resources or services that produce major improvements in outcome, such as increased survival, but that are attainable with limited financial means and modest infrastructure. It includes minor endoscopic procedures to improve major clinical outcomes (i.e., sclerotherapy/adrenaline injection, band ligation, plasma expanders, basic surgical interventions). |
| III: Enhanced                   |
| Third-tier resources or services that are optional but important. Enhanced-level resources may produce minor improvements in outcome but increase the number and quality of therapeutic options. Most procedures that improve clinical outcome are available (i.e., biliopancreatic endoscopy, electrosurgical unit, polypectomy/mucosectomy, anaesthesia back-up). |
| IV: Maximal                     |
| High-level resources or services that may be used in some high-resource countries or be recommended in guidelines that assume unlimited resources. To be useful, maximal-level resources typically depend on the existence and functionality of all lower-level resources. |
One cascade adaptation recommendation on the role of covered self-expanding metal stents (C-SEMS) for refractory bleeding failed to achieve the ≥ 75% agreement level. The comments provided by the participants pointed towards the unavailability of C-SEMS and balloon tamponade for treatment of refractory variceal bleeding. For that reason, the statements were revised to include best supportive care and non-selective beta blocker (NSBB) treatment in Levels I and II.

Cascade adaptation: Each original recommendation with the accepted adaptations is reported in Table 3. It was assumed that basic endoscopy is available at all levels of care. However, added to the availability of endoscopy, some specific resources influenced the adaptation of the original guidelines and can be categorized as follows:

1. Pharmacological treatment
2. Therapeutic endoscopy
3. Interventional radiology and surgery
4. Pharmacological treatment

At the basic level, best supportive care and NSBB treatment were recommended as adaptations for primary as well as secondary prophylaxis of variceal hemorrhage. Octreotide was the recommended adaptation when urgent endoscopic treatment of active bleeding episodes was not available.

1. Endoscopic treatment
   a) Esophageal varices
      At the most basic level, band ligation of varices is the treatment of choice in our adaptation. It is available in most centers and represents the most effective endoscopic treatment for acute esophageal variceal bleeding and for secondary prophylaxis. However, round-the-clock availability of emergency endoscopic services may be limited, representing the main difference between Levels I and II. Thus, timing of endoscopy may be delayed, worsened by a lack of availability of blood transfusion at Level I. Thus, we recommended as a possible adaptation use of octreotide and supportive care.

b) Gastric varices
   Injection of tissue adhesive (cyanoacrylate) does not require a high level of technical expertise. Unfortunately, it is not available at the basic and limited levels. For that reason, treatment of acute bleeding from isolated gastric varices with band ligation can be considered even though evidence for this procedure is limited [12].

c) Refractory bleeding
   For endoscopic rescue treatment, balloon tamponade and SEMS are not available at the basic level. They can be recommended only in some centers at the limited level, but in all centers at the enhanced level.

2. Radiologic and surgical treatment

Transjugular intrahepatic portosystemic shunt (TIPS), balloon-occluded retrograde transvenous obliteration (BRTO), and surgical options such as the mesenteric-left portal vein bypass (Meso-Rex operation) are not available except at the enhanced resource level. For prevention of recurrent variceal hemorrhage, maximal endoscopic and pharmacological treatment options should be exhausted.

Endoscopic treatment of gastroesophageal varices represents by far the most life-saving endoscopic intervention in most of developing African countries given the high prevalence of viral and parasitic liver infections. For that reason, primary endoscopic treatment – i.e. band ligation – has become available also at Level II in most centers, providing a favorable prognosis for patients with active bleeding. However, technical feasibility may be hampered by irregular provision of endoscopic resources such as training, scope maintenance, and availability of ligators.

Despite endoscopy’s prominent role in this condition, resources for it are not easily accessible for most patients with gastroesophageal varices due to limited capacity, long distances or costs. In this context, use of NSBB is consistently recommended through Level I and II as a less effective but more widely available resource.

Treatment of gastric varices remains challenging. The main priority is adequate and cost-effective supply of tissue adhesive to developing countries as the technical feasibility for its injection is available. Alternatively, band ligation or NSBB may represent surrogate treatments.

Conclusion

In conclusion, endoscopic treatment of variceal bleeding represents the most life-saving endoscopic intervention in most developing countries. In a resource-limited situation, adaptation of general guidelines may help optimize endoscopic care in this patient group.
Table 3  Adaptation of recommendations according to level of treatment care.

| Original statements | Suggested modifications |
|---------------------|-------------------------|
| **Surveillance of esophageal varices** | |
| 1 In compensated patients with no varices at screening endoscopy and with ongoing liver injury (e.g. active drinking in alcoholics, lack of SVR in HCV), surveillance endoscopy should be repeated at 2-year intervals. | Level I/II/III: No adjustment |
| 2 In compensated patients with small varices and with ongoing liver injury (e.g. active drinking in alcoholics, lack of SVR in HCV), surveillance endoscopy should be repeated at 1-year intervals. | Level I/II/III: No adjustment |
| 3 In compensated patients with no varices at screening endoscopy in whom the aetiological factor has been removed (e.g. achievement of SVR in HCV; long-lasting abstinence in alcoholics) and who have no co-factors (e.g. obesity), surveillance endoscopy should be repeated at three year intervals. | Level I/II/III: No adjustment |
| 4 In compensated patients with small varices at screening endoscopy in whom the etiological factor has been removed (e.g. achievement of SVR in HCV; long-lasting abstinence in alcoholics) and who have no co-factors (e.g. obesity), surveillance endoscopy should be repeated at 2-year intervals. | Level I/II/III: No adjustment |
| **Patients with no varices or small varices** | |
| 5 Patients with small varices with red whale marks or Child-Pugh C class have an increased risk of bleeding and should be treated with non-selective beta blockers (NSBB). | Level I/II/III: No adjustment |
| 6 Patients with small varices without signs of increased risk may be treated with NSBB to prevent bleeding. Further studies are required to confirm their benefit. | Level I/II/III: No adjustment |
| **Patients with medium-large varices** | |
| 7 Either NSBB or endoscopic band ligation is recommended for the prevention of the first variceal bleeding of medium or large varices. | Level I: NSBB and endoscopic surveillance every 6 months  
Level II: No adjustment  
Level III: No adjustment |
| 8 The choice of treatment should be based on local resources and expertise, patient preference and characteristics, contraindications and adverse events. | Level I/II/III: No adjustment |
| **Management of the acute bleeding episode** | |
| 10 The goal of resuscitation is to preserve tissue perfusion. Volume restitution should be initiated to restore and maintain hemodynamic stability. | Level I/II/III: No adjustment |
| 11 Packed red blood cells transfusion should be done conservatively at a target haemoglobin level between 7 and 8 g/ dl, although transfusion policy in individual patients should also consider other factors such as cardiovascular disorders, age, hemodynamic status and ongoing bleeding. | Level I: Blood pressure monitoring and fluid resuscitation with crystalloid fluids  
Level II: Restrictive blood transfusion strategy based on clinical judgement  
Level III: No adjustment |
| 12 Recommendations regarding management of coagulopathy and thrombocytopenia cannot be made on the basis of currently available data. | Level I/II/III: No adjustment |
| 13 PT/INR is not a reliable indicator of the coagulation status in patients with cirrhosis. | Level I/II/III: No adjustment |
| **Antibiotic prophylaxis** | |
| 14 Antibiotic prophylaxis is an integral part of therapy for patients with cirrhosis presenting with upper gastrointestinal bleeding and should be instituted from admission. | Level I: No adjustment  
Level II: No adjustment  
Level III: No adjustment |
| Original statements                                                                 | Suggested modifications                                                                 |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| **Prevention of hepatic encephalopathy**                                            |                                                                                         |
| 18 Recent studies suggest that either lactulose or rifaximin may prevent hepatic en- | Level I: Lactulose and antibiotics according to local preferences and availability       |
| cephalopathy in patients with cirrhosis and upper gastrointestinal bleeding. However, | Level II: Lactulose and nonabsorbable antibiotics                                          |
| further studies are needed to evaluate the risk/benefit ratio and to identify high risk | Level III: No adjustment                                                                   |
| patients before a formal recommendation can be made.                                 |                                                                                         |
| 19 Although, there are no specific studies in acute variceal bleeding, it is recom- | Level I: Lactulose and best supportive care                                               |
| mended to adopt the recent EASL/AASLD HE guidelines which state that episodic HE should | Level II: No adjustment                                                                   |
| be treated with lactulose (25 ml q 12 h until 2–3 soft bowel movements are produ- | Level III: No adjustment                                                                   |
| ced, followed by dose titration to maintain 2–3 soft bowel movements per day).       |                                                                                         |
| 20 Child-Pugh class C, the updated MELD score, and failure to achieve primary heae- | Level I/II/III: No adjustment                                                             |
| mostasis are the variables most consistently found to predict six week mortality.     |                                                                                         |
| **Pharmacological treatment**                                                        |                                                                                         |
| 21 In suspected variceal bleeding, vasoactive drugs should be started as soon as pos- | Level I: Octreotide                                                                       |
| sible, before endoscopy.                                                             | Level II: Octreotide                                                                       |
| Level III: No adjustment                                                             |                                                                                         |
| 22 Vasoactive drugs (terlipressin, somatostatin, octreotide) should be used in combi- | Level I: Octreotide and endoscopic therapy is recommended                                  |
| nation with endoscopic therapy and continued for up to five days.                    | Level III: No adjustment                                                                   |
| 23 Hyponatremia has been described in patients under terlipressin, especially in pa- | Level I/II/III: No adjustment                                                             |
| tients with preserved liver function. Therefore, sodium levels must be monitored.    |                                                                                         |
| **Endoscopy**                                                                        |                                                                                         |
| 24 Following hemodynamic resuscitation, patients with upper gastrointestinal bleed- | Level I: Technical expertise may not be available on a 24/7 basis                         |
| ing and features suggesting cirrhosis should undergo esophagogastroduodenoscopy with- | Level II: Endoscopy within 24 hours; trained emergency team with necessary technical expertise available |
| in 12 h of presentation.                                                             | Level III: No adjustment                                                                   |
| 25 In the absence of contraindications (QT prolongation), pre-endoscopy infusion of  | Level I: Endoscopy even when pre-endoscopic erythromycin infusion is not available.       |
| erythromycin (250 mg IV 30–120 min before endoscopy) should be considered.            | Level II: No adjustment                                                                   |
| Level III: No adjustment                                                             |                                                                                         |
| 26 The availability both of an on-call gastrointestinal endoscopist proficient in en- | Level I: Technical expertise may not be available on a round-the-clock basis              |
| doscope haemostasis and on-call support staff with technical expertise in the usage of | Level II: Endoscopy within 24 hours; trained emergency team with necessary technical expertise available |
| endoscopic devices enables performance of endoscopy on a 24/7 basis and is recom- | Level III: No adjustment                                                                   |
| mended.                                                                             |                                                                                         |
| 27 Patients with acute variceal hemorrhage should be considered for ICU or other well | Level I: Best supportive care                                                               |
| monitored units.                                                                     | Level II: Best supportive care with best available monitoring of vital parameters         |
| Level III: No adjustment                                                             |                                                                                         |
| Table 3  (Continuation) |
|------------------------|
| **Original statements** | **Suggested modifications** |
| 28 In patients with altered consciousness, endoscopy should be performed with protection of the airway. | Level I: Patients with ongoing active hematemesis should be placed in a stable side position immediately; continuous active suction of blood and gastric contents  
Level II: Stable side position; continuous sedation; continuous active suction of blood and gastric contents; emergency endoscopy  
Level III: No adjustment |
| 29 Ligation is the recommended form of endoscopic therapy for acute oesophageal variceal bleeding. | Level I: Best supportive and octreotide  
Level II: No adjustment  
Level III: No adjustment |
| 30 Endoscopic therapy with tissue adhesive (e.g. N-butyl-cyanoacrylate) is recommended for acute bleeding from isolated gastric varices (IGV) and those gastroesophageal varices type 2 (GOV2) that extend beyond the cardia. | Level I: Best supportive care and NSBB  
Level II: Endoscopic band ligation can be considered as a salvage treatment in case of acute bleeding from small gastric varices when tissue adhesive is not available  
Level III: No adjustment |
| 31 To prevent rebleeding from gastric varices, consideration should be given to additional glue injection (after 2 to 4 weeks), beta-blocker treatment or both combined or TIPS. More data in this area are needed. | Level I: Best supportive care and NSBB  
Level II: NSBB and endoscopic band ligation when tissue adhesive or TIPS are not available  
Level III: No adjustment |
| 32 EVL or tissue adhesive can be used in bleeding from gastroesophageal varices type 1 (GOV1). | Level I: Best supportive care and NSBB  
Level II: No adjustment  
Level III: No adjustment |
| Early TIPS placement | |
| 33 An early TIPS with PTFE-covered stents within 72 h (ideally < 24 h) must be considered in patients bleeding from EV, GOV1 and GOV2 at high risk of treatment failure (e.g. Child-Pugh class C < 14 points or Child-Pugh class B with active bleeding) after initial pharmacological and endoscopic therapy. Criteria for high-risk patients should be refined. | Level I: Best supportive care and NSBB  
Level II: Maximal endoscopic and pharmacological therapy including NSBB when TIPS is not available  
Level III: No adjustment |
| Balloon tamponade | |
| 34 Balloon tamponade, given the high incidence of its severe adverse events, should only be used in refractory oesophageal bleeding, as a temporary “bridge” (for a maximum of 24 h) with intensive care monitoring and considering intubation, until definitive treatment can be instituted. | Level I: Best supportive care and NSBB  
Level II: No adjustment  
Level III: No adjustment |
| Use of self-expandable metal stents | |
| 35 Data suggest that self-expanding covered esophageal metal stents may be as efficacious and a safer option than balloon tamponade in refractory oesophageal variceal bleeding. | Level I: Best supportive care and NSBB  
Level II: No adjustment  
Level III: No adjustment |
| Management of treatment failures | |
| 36 Persistent bleeding despite combined pharmacological and endoscopic therapy is best managed by PTFE-covered TIPS. | Level I: Best supportive care and NSBB  
Level II: Maximal endoscopic and pharmacological therapy including NSBB when TIPS is not available  
Level III: No adjustment |
| 37 Rebleeding during the first 5 days may be managed by a second attempt at endoscopic therapy. If rebleeding is severe, PTFE-covered TIPS is likely the best option. | Level I: Best supportive care and NSBB  
Level II: Maximal endoscopic and pharmacological therapy including NSBB when TIPS is not available  
Level III: No adjustment |
| Preventing recurrent variceal haemorrhage and other decompensating events | |
| Prevention of recurrent variceal haemorrhage | |
| 38 First line therapy for all patients is the combination of NSBB (propranolol or nadolol) + EVL. | Level I: NSBB  
Level II: No adjustment  
Level III: No adjustment |
Table 3 (Continuation)

| Original statements                                                                 | Suggested modifications                                                                 |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 39 EVL should not be used as monotherapy unless there is intolerance/contraindica-   | Level I: No adjustment
| tions to NSBB.                                                                        | Level II: No adjustment
|                                                                                    | Level III: No adjustment
| 40 NSBB should be used as monotherapy in patients with cirrhosis who are unable or  | Level I: No adjustment
| unwilling to be treated with EVL.                                                   | Level II: No adjustment
|                                                                                    | Level III: No adjustment
| 41 Covered TIPS is the treatment of choice in patients that fail first-line therapy  | Level I: Best supportive care and NSBB
| (NSBB + EVL).                                                                        | Level II: NSBB, EVL, and SEMS
|                                                                                    | Level III: No adjustment
| 42 Because carvedilol has not been compared to current standard of care, its use   | Level I/II/III: No adjustment
| cannot be recommended in the prevention of rebleeding.                               |                                                                                     |
| Secondary prophylaxis of portal hypertensive gastropathy (PHG)                     |                                                                                     |
| 43 PHG has to be distinguished from gastric antral vascular ectasia because        | Level I/II/III: No adjustment
| treatments are different.                                                            |                                                                                     |
| 44 NSBB are first-line therapy in preventing recurrent bleeding from PHG.           | Level I: No adjustment
|                                                                                    | Level II: No adjustment
|                                                                                    | Level III: No adjustment
| 45 TIPS might be considered in patients with transfusion-dependent PHG in whom    | Level I: NSBB
| NSBB and/or endoscopic therapies fail.                                              | Level II: NSBB when TIPS is not available
|                                                                                    | Level III: No adjustment
| Treatment of portal hypertension in EHPVO                                           |                                                                                     |
| 46 All patients in whom thrombosis has not been recanalized should be screened     | Level I: No adjustment
| for gastroesophageal varices within 6 months of the acute episode. In the absence  | Level II: No adjustment
| of varices, endoscopy should be repeated at 12 months and 2 years thereafter.       | Level III: No adjustment
| 47 There is insufficient data on whether beta blockers or endoscopic therapy       | Level I/II/III: No adjustment
| should be preferred for primary prophylaxis. Thus, guidelines for cirrhosis should  |                                                                                     |
| be applied.                                                                          |                                                                                     |
| 48 For the control of acute variceal bleeding, endoscopic therapy is effective.     | Level I/II/III: No adjustment
| 49 Evidence suggests that beta blockers are as effective as endoscopic ligation     | Level I/II/III: No adjustment
| therapy for secondary prophylaxis.                                                  |                                                                                     |
| 50 Mesenteric-left portal vein bypass (Meso-Rex operation) should be considered in  | Level I: Best supportive care and NSBB
| all children with complications of chronic EHPVO, who should be referred to centres| Level II: Maximal endoscopic and pharmacological
| with experience in treating this condition.                                          | therapy including NSBB
|                                                                                    | Level III: No adjustment
| SVR, sustained virological response; HCV, hepatitis C virus; NSBB, nonselective beta blockers; EASL, European Association for the Study of Liver; AASLD, American Association for the Study of Liver Diseases; HE, hepatic encephalopathy; ICU, intensive care unit; IGV, isolated gastric varices; GOV2, gastroesophageal varices type 2; TIPS, transjugular intrahepatic portosystemic shunt; EVL, endoscopic variceal ligation; GOV1, gastroesophageal varices type 1; PTFE, polytetrafluoroethylene; SEMS, self-expanding metal stent; PHG, portal hypertensive gastropathy; EHPVO, extrahepatic portal vein obstruction

Competing interests

The authors declare that they have no conflict of interest.

References

[1] James SL, Abate D, Abate KH et al. GBD 2017 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet 2018; 392: 1789–1858

[2] Moon AM, Singal AG, Tapper EB. Contemporary epidemiology of chronic liver disease and cirrhosis. Clin Gastroenterol Hepatol 2019; doi:10.1016/j.cgh.2019.07.060

[3] Study GBoD. Accessed 3rd Jan 2020. https://vizhub.healthdata.org/gbd-compare

[4] Byass P. The global burden of liver disease: a challenge for methods and for public health. BMC Med 2014; 12: 159

[5] Mokdad AA, Lopez AD, Shahraz S et al. Liver cirrhosis mortality in 187 countries between 1980 and 2010: a systematic analysis. BMC Med 2014; 12: 145

[6] World Health Organization. Global hepatitis report. 2017: https://www.who.int/hepatitis/publications/global-hepatitis-report2017/en/
[7] de Franchis R, Baveno VIF. Expanding consensus in portal hypertension: Report of the Baveno VI Consensus Workshop: Stratifying risk and individualizing care for portal hypertension. J Hepatol 2015; 63: 743–752

[8] Hassan C, Aabakken L, Ebigbo A et al. Partnership with African Countries: European Society of Gastrointestinal Endoscopy (ESGE) - Position Statement. Endosc Int Open 2018; 6: E1247–E1255

[9] Karstensen JG, Ebigbo A, Aabakken L et al. Nonvariceal upper gastrointestinal hemorrhage: European Society of Gastrointestinal Endoscopy (ESGE) Cascade Guideline. Endosc Int Open 2018; 6: E1256–E1263

[10] Ebigbo A, Karstensen JG, Aabakken L et al. Esophageal stenting for benign and malignant disease: European Society of Gastrointestinal Endoscopy (ESGE) Cascade Guideline. Endosc Int Open 2019; 7: E833–E836

[11] Milholland AV, Wheeler SG, Heieck JJ. Medical assessment by a Delphi group opinion technic. N Engl J Med 1973; 288: 1272–1275

[12] Shiha G, El-Sayed SS. Gastric variceal ligation: a new technique. Gastrointest Endosc 1999; 49: 437–441