The BIS monitor is still a kind of "black box". Descriptions of the algorithm are sparse and, in their details, contradictory.[2,3] Recently a part of the BIS algorithm was made public:[4] burst suppression ratios > 40% are invariably and linearly correlated with the BIS (r = -1), according to the equation: BIS = 50 – burst suppression ratio / 2.

Conversely, BIS values below 30 are linearly correlated with the burst suppression ratio. Therefore, the reported BIS value of 8 can be directly translated into a burst suppression ratio of 84% according to the above equation.

A BIS value of 8 is not related to phase coupling, nor to bispectral analysis, but is just an effect of the burst suppression ratio.

Thus, the observation of Mérat *et al.* is not BIS-specific but merely secondary to the occurrence of a burst suppression pattern associated with cerebral ischemia. In principle, such extensive burst suppression pattern can easily be identified by visual inspection of the electroencephalography and does not require processed monitoring like the BIS.

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References

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Reply:

We agree with Dr. J. Bruhn concerning the poor interest of the bispectral index (BIS) for values below 30. However our purpose wasn't to say that BIS always reflects the depth of anesthesia. We solely think that an unexpected modification of the BIS value, without modifications of anesthesia, is abnormal. In such a case, when the BIS decrease is unrelated to anesthesia, we suggest that the BIS may be useful to detect severe cerebral ischemia, whatever the BIS value.

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Injury to the liver and spleen after diagnostic ERCP

To the Editor:

Endoscopic retrograde cholangiopancreatography (ERCP) is an invasive procedure performed to diagnose and treat pancreatic and biliary disease. In approximately 5%–10% of cases, the procedure itself causes adverse events.[1] Splenic injury is a relatively rare, but increasingly reported complication of endoscopic procedures.

A 42-yr-old man was referred for diagnostic ERCP because of intermittent epigastric pain. His past medical history was unremarkable. Abdominal sonography revealed cholecystolithiasis with a markedly dilated common bile duct. ERCP was performed with relative ease. The cholangiogram showed cholecystolithiasis, a distal common duct stricture, and several stones within the dilated prestenotic portion of the duct. The patient complained of diffuse abdominal pain soon after the procedure. Vital signs and physical examination were unremarkable.

Twenty minutes after, the patient was hypotensive (systolic blood pressure 70 mmHg), but was otherwise well. Intravenous saline was administered, and the blood pressure returned to normal. One hour later, hypotension recurred, and the patient's hematocrit was found to be 18%. After resuscitation with blood and crystalloid, a hemoperitoneum was found upon opening the abdominal cavity (2.0 L). Exploration revealed a splenic laceration as the source of bleeding. Other organs were normal. Conservative surgery was performed and the postoperative course was uneventful.

Several cases of splenic injury have been described after colonoscopy, and rare cases of splenic rupture after ERCP have been published. Splenic rupture during routine ERCP was reported in 1988.[2] A possible mechanism is the avulsion of the splenic vessels secondary to bowing of the endoscope in the stomach during attempts to pass the large endoscopes through the narrowed duodenum or while attempting to cannulate the papilla while in the "long" position.[3]

Splenic injury during endoscopy is a real possibility and may occur even when the procedure is not technically difficult. Delayed diagnosis is a characteristic feature in many cases. Although the signs and symptoms are the same as for splenic rupture from non-endoscopic causes, splenic injury needs to be considered if sudden abdominal pain, hypotension, or drop in hematocrit value occur after diagnostic or therapeutic ERCP. The diagnosis requires a high