



Karl Storz Lecture I

Endoscopic management of acute gastrointestinal bleeding in children: Time for a radical rethink[☆]

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ABSTRACT

Currently we are no nearer than 10 or 20 years ago providing a safe, adequate, and effective round-the-clock endoscopic services for acute life-threatening gastrointestinal bleeding in children. Preventable deaths are occurring still, and it is a tragedy. This is owing to a number of factors which require urgent attention. Skill-mix and the ability of available endoscopists in the UK are woeful. Manpower is spread too thinly and not concentrated in centers of excellence, which is necessary given the relative rarity of the presentation. Adult gastroenterologists are increasingly reticent regarding their help in increasingly litigious times. Recent work on identification of those children likely to require urgent endoscopic intervention has mirrored scoring systems that have been present in adult circles for many years and may allow appropriate and timely intervention. Recent technical developments such as that of Hemospray® may lower the threshold of competency in dealing with this problem endoscopically, thus allowing lives to be saved. Educational courses, mannequin and animal model training are important but so will be appropriate credentialing of individuals for this skill-set. Assessment of competency will become the norm and guidelines on a national level in each country mandatory if we are to move this problem from the “too difficult” to the “achieved”. It is an urgent problem and is one of the last emergencies in pediatrics that is conducted poorly. This cannot and should not be allowed to continue unchallenged.

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When a child enters a hospital in the developed world with a recognized emergency in 2015, mortality would be expected to be minimal. Indeed death would usually be attributable to the disease and its progression despite excellence of management, rather than failings in the management of the condition by the teams involved. Unfortunately, this is a set of circumstances which is not infrequently reversed in the emergency management of acute upper gastrointestinal bleeding (AUGIB) in children. [Table 1](#) illustrates some reasons why children are still dying from this AUGIB and [Figs. 1 and 2](#) illustrate some causes.

A recent UK nationwide survey of practice in 2014 uncovered serious failings within regional pediatric gastroenterology training centers [1]. There are around 20 such tertiary centers in the UK and of 16 centers who responded only 19% claimed that all their consultants were capable in all endoscopic techniques needed to stop AUGIB and by contrast 19% admitted that none of their consultants had these skills. Just over half had an out-of-hours on-call service and 69% of those were run by pediatric surgeons (who also are unfamiliar on the whole with most of the techniques required to deal endoscopically with AUGIB)—with contribution by pediatric gastroenterologists in less than half. A third

had no electronically-available written care pathways and many did not give their patients written instructions on future actions if the problem were to recur, nor did they administer alert cards or bracelets.

The actual size of AUGIB in the UK is not known but has been estimated to occur in around 300–500 children per annum and sadly it still leads to preventable deaths. It seems vital therefore that standards are examined and guidelines developed for variceal and non-variceal AUGIB management in children. The NHS standards organization, NICE, has published some guidelines in 2012 and 2014 but unfortunately limited their advice to those >16 years.

One area that requires attention is the variable skill-set of those expected to perform emergency endoscopy in children for AUGIB. A number of organizations [the adult-oriented European Society of Gastrointestinal Endoscopy (ESGE) and the pediatric specific European Society of Paediatric Gastroenterology Hepatology and Nutrition (ESPGHAN)] recommend that this should occur as soon as possible (and definitely within 12 hours in those who are requiring circulatory support).

The second area is the absence of 24/7 on-call cover for large parts of Europe and North America by people with the requisite endoscopic skills. This comes down not only to manpower but also the training of those in these positions and the training of those likely soon to be in these jobs. Adult GI bleeding services for out-of-hours are now well established and can help where available. The numbers of cases though in children are also a problem as only 3 of 16 of the tertiary centers in

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Table 1
Reasons for poor outcome in AUGIB.

On admission	Intervention	Postintervention
Lack of recognition of the severity of the bleed.	Limited availability of endoscopists with skill set for therapeutic endoscopy.	Poor recognition of the potential for rebleeding.
Poor knowledge of best practice in preendoscopy management.		Absence of proper information to families on discharge (e.g. provision of high-risk bracelets)
Incorrect decision making regarding the timing/urgency of endoscopy		

the afore-mentioned UK survey saw more than 20 cases per year. This calls for a major rethink of provision and likely centralization of this type of service.

If we can be realistically backed up by our adult colleagues then that is a good model but this again is a very variable commodity and when unavailable we must have some back-up service available around the clock. Trained individuals need a good starting point and this can involve hands-on training with animal model courses, e-learning opportunities and of course one-to-one training in live cases. Furthermore summative direct observational operating skill (DOPS) type assessments should be introduced and part of any end-of-training assessments and sign-off should include a number of module type assessments including competency in management of AUGIB by endoscopy. This arguably should be part of the training of pediatric surgeons and pediatric gastroenterologists alike. It is clear that only a few of our colleagues in large centers who are senior are competent in all endoscopic hemostasis therapy and this is unacceptable. As well as training the next generation it is mandatory that we look at ourselves and retrain if we are not competent. However, in view of the numbers presenting at each tertiary center in the UK for instance (<20 per year in the majority), maintenance of skills will be a real challenge [1]. So this comes down to either maintenance of skills by immersion in adult GI endoscopy emergency bleeding cases which is very difficult practically or a move to centralization of these skills and techniques.

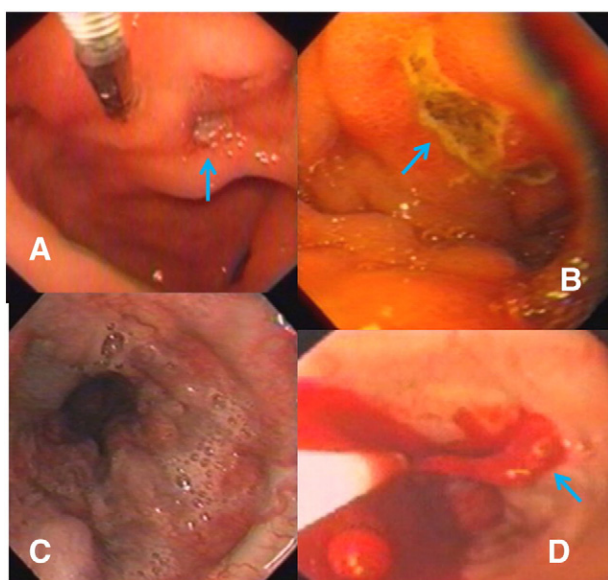


Fig. 1. Pediatric causes of acute gastrointestinal bleeding. A) Chronic duodenal ulcer; B) benign gastric ulceration; C) esophageal varices and D) acute bleeding from ruptured varix.

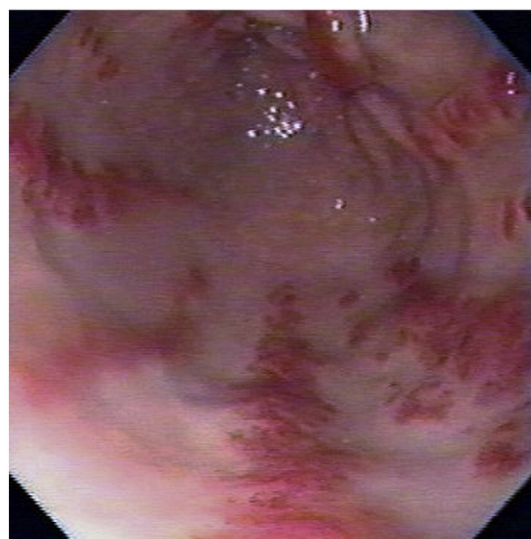


Fig. 2. Unusual causes of acute gastrointestinal bleeding – gastric antral vascular ectasia (GAVE).

The evolution of AUGIB pediatric “super-centers” with transfer of stabilized patients from those without the service capability is a model that seems to have many attractions. Clearly safety pretransfer is paramount but is achievable with the use of drugs such as octreotide and terlipressin. Geographical issues must be overcome and nowadays should be easily surmountable, although may present challenges in other countries such as the USA, Canada and Australia. A parallel might be ECMO provision which is equally rarely needed and provided in only a handful of centers.

Fundamentally, it seems clear that a triage process followed by funding of a handful of centers of excellence is the only strategy that can work. Otherwise children will continue to die needlessly from a condition which presents a rare remaining opportunity in modern medicine—the eradication of the “eminently preventable” death.

1. Practical management

1.1. Scoring systems

In adults presenting with AUGIB (with or without comorbidities) there exist reasonably reliable predictive scoring systems (Rockall, Blatchford [aka Glasgow], Addenbrooke) to identify which patients are high risk (of mortality, rebleeding, need for blood transfusion, surgical intervention) and those at low risk who can be safely discharged [2–6]. These depend on morbidity assessment and are weighted for variables such as urea level, age, presence of “shock”, presence of comorbidities such as ischaemic cardiac disease, renal failure, malignancy etc., and are preendoscopic (Blatchford and Addenbrooke’s scoring systems) and full or postendoscopic (Rockall scoring system). Prospective validation of these scoring systems has occurred [7–11]. There are scoring systems specific to particular bleeding lesions such as the APACHE score which relate to peptic ulcer bleeds [12,13]. Other systems have looked to identify those at low risk when presenting with AUGIB [14]. Yet other groups have looked at risk of early rebleeding and mortality risk in AUGIB [15–18]. A prospective comparison study identified the Forrest classification as the most accurate in predicting rebleeding rate and mortality [19].

Such adult-based scoring is not usually applicable to children presenting with AUGIB as most of the physiological and hematological/biochemical variables on which they are based are not pediatric specific. Indeed pathologies leading to AUGIB also differ between the age groups. We have developed a score which can accurately predict the need for

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