



## REVIEW

# The setting up and running of a cross-county out-of-hours gastrointestinal bleed service: a possible blueprint for the future

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#### ABSTRACT

**Objective** Acute upper gastrointestinal bleeding (AUGIB) results in 25 000 hospital admissions annually. Patients admitted at weekends with AUGIB have increased mortality, and guidelines advise out-of-hours endoscopy. We present retrospective data from our service involving the interhospital transfer of patients.

**Design** We pooled resources of two neighbouring general hospitals, just north of London. Emergency endoscopy is performed at the start of the list followed by elective endoscopy in the endoscopy unit on Saturday and Sunday mornings. From Friday evening to Sunday morning, patients admitted to Queen Elizabeth II Hospital (QEII) are medically stabilised and transferred to Lister Hospital by ambulance.

**Results** 240 endoscopies were performed out of hours from December 2007 to March 2011. Of these, 54 patients were transferred: nine had emergency endoscopy at QEII as they were medically unstable; eight of the patients transferred required therapeutic intervention for active bleeding. The mean pre-endoscopy Rockall score of those transferred was 2.5. We examined the records of 51 of the 54 patients transferred. There were three deaths within 30 days after endoscopy not associated with the transfer process. 19 (37%) patients had reduced hospitalisation after having their endoscopy at the weekend.

**Conclusions** The introduction of the out-of-hours endoscopy service in our trust has had multiple benefits, including patients consistently receiving timely emergency endoscopy, significantly reduced disruption to emergency operating theatres, and participation of endoscopy nurses ensures a better and safer

experience for patients, and better endoscopy decontamination. We suggest our model is safe and feasible for other small units wishing to set up their own out-of-hours endoscopy service to adopt.

#### INTRODUCTION

Acute upper gastrointestinal bleeding (AUGIB) affects 103–172 per 100 000 adults per year in the UK.<sup>1</sup> In the USA, it causes 250 000–300 000 emergency hospital admissions and approximately 30 000 deaths per year.<sup>2</sup> A recent study in the UK reported a fall in case fatality from 11.4% in 1999–2000 to 8.6% in 2006–7.<sup>3</sup> However, the same study found that compared to weekdays, case fatality was 13% higher for weekend admissions and 41% higher for admissions on public holidays. The increased mortality at the weekend has also previously been noted in the USA.<sup>4</sup> The difference in mortality from AUGIB at weekends (and public holidays) compared to weekdays has been attributed, at least partly, to a lack of out-of-hours endoscopy services in many hospitals.

There has been a drive in the UK to raise the standards for the management of patients with AUGIB.<sup>5</sup> The National Institute for Health and Clinical Excellence has just issued new guidance on the management of AUGIB.<sup>6</sup> This is partly following recent evidence from a UK-wide audit<sup>7</sup> as well as a report from the National Patient Safety Agency's national reporting and learning system, which highlighted, among other deficiencies, a

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widespread lack of access to out-of-hours endoscopy services throughout the UK.<sup>5</sup>

A British Society of Gastroenterology position paper on out-of-hours gastroenterology<sup>8</sup> has made recommendations as to how hospitals of various sizes might deal with patients with AUGIB. One important recommendation is that patients with AUGIB can be transferred to larger units after resuscitation.

The East and North Hertfordshire NHS Trust is composed of the Queen Elizabeth II Hospital (QEII) and the Lister Hospital, and serves a combined population of 560 000. In 2007, the trust employed six (now eight) gastroenterology consultants who provided an emergency endoscopy service for AUGIB Monday to Friday at 08:30 hours at both sites. There was no formal agreement for weekend endoscopy service and out of hours gastroenterologists attended out of good will. This was unsatisfactory for patients as well as junior and senior medical staff and was not in keeping with a modern NHS service. We decided it was necessary to start a weekend on-call service for emergency gastroscopy. Here we describe the process of setting up the out-of-hours endoscopy service in our trust that runs two acute district general hospitals, and present the results of our retrospective audit for the first 4 years of the service with emphasis on the patients transferred between the sites.

## SETTING UP THE SERVICE

### Medical staffing

It was decided that the core staff providing emergency gastroscopy should be the six (now eight) gastroenterology consultants. While the trust has a total of four specialty trainees in gastroenterology, they are of varying seniority and endoscopic experience and it was not deemed appropriate to have them on the emergency rota. In addition, they were already on an acute medical rota. There are several surgeons and an elderly care physician who perform gastroscopy in our unit but they do not undertake therapeutic gastroscopy.

The gastroenterologists were already committed to a weekend acute medical on-call rota requiring regular ward rounds when on call, and it was felt that commitment to two different rotas was unsustainable. When on call, elective activity is cancelled. Our cardiology colleagues were therefore keen to come off the regular acute medical rota during the week so that they could concentrate on the newly opened cardiac catheter laboratory.

After discussion with managers and consultant physicians of other specialities at both sites, an agreed plan was implemented to set up the out-of-hours gastrointestinal bleed service:

- The gastroenterologists stopped medical on-call work at weekends, but remained on the medical rota for weekdays. The cardiologists stopped medical on call during weekdays, but have remained on the medical rota for

weekends. This set up has meant the weekday and weekend on-call cycles balance at the same frequency.

- At QEII Hospital, the two experienced staff grades in acute medicine were promoted to associate specialists and agreed to participate in the acute medical on-call rota (with a consultant available as backup).
- The trust appointed extra acute physicians to Lister Hospital to support acute medicine at that site (there are now three in post).
- A modest increase in payment for the increased frequency of the on calls to those physicians on the more onerous medical on-call rota was also agreed.

### Nursing staff

The contract of our endoscopy nurses stipulated the possibility of on-call work. Since 2006 there had been an endoscopy nurse on call for each site. The nurses provide a decontamination service for laryngoscopes, bronchoscopes, cystoscopes and gastroscopes and provide assistance during emergency gastroscopy. Before this, theatre nurses would support the gastroenterologists attending bleeding patients. To ensure correct decontamination and assist during emergency endoscopy, a business case was put forward for endoscopy nurses to be on call at each site, with funding from theatres and intensive treatment units. The endoscopy nurses are now on call nightly from 18:00 to 08:00 hours and 24 h over the weekend for each site.

Once the site for the new emergency service was agreed (see below), funding was approved for a third endoscopy nurse to be available for the emergency lists on Saturday and Sunday mornings. As part of the growing demand for outpatient endoscopy we are now performing elective endoscopy at weekends, with a total of five endoscopy nurses present (includes registered and non-registered staff).

### Site and capacity

The QEII and Lister Hospitals are 13 miles apart and are linked by a mostly freely running motorway meaning that interhospital transfers are rapid; there is a precedent for the transfer of stable emergency medical patients between sites during bed crises.

For some years, out-of-hours emergency endoscopy had been carried out in the operating theatres at each site, which are equipped with video monitors. However, performing regular semi-elective emergency endoscopy in an operating theatre at the weekend was difficult due to the demands of the surgical specialities.

The endoscopy unit at the QEII is in a physically separate building from the main hospital. The endoscopy unit at the Lister is in the main hospital building and was deemed the safer and obvious choice for weekend emergency endoscopy. For patients who are too unwell for transfer between the two sites, emergency endoscopy is performed at the QEII theatres.

### The process

Any patient who is admitted to the QEII Hospital from Friday evening until Sunday morning is transferred to Lister Hospital after being medically stabilised. The process is coordinated by the medical registrars and the bed managers at the two sites. Patient transfer is undertaken by the ambulance services.

When the service first started in 2007, the protocol was that at 07:00 hours on Saturday and Sunday, the gastroenterologist would ring the medical registrar at the Lister Hospital to ascertain if emergency endoscopy was required. The gastroenterologist would then call the first on-call endoscopy nurse who in turn contacted the other two nurses to call them in or stand the team down. This no longer occurs because since mid-2011, elective upper and lower gastrointestinal endoscopy is performed on Saturday and Sunday morning with the emergency bleeds slotted in. Elective and emergency endoscopy is carried out from 08:30 hours onwards in the Lister endoscopy unit with five endoscopy nurses present. After the list finishes, one nurse remains on call for each site. If a patient needs urgent gastroscopy outside the normal weekend list, this is done in the operating theatre at the hospital where the patient is based (ie, the patient is not transferred between sites) with an anaesthetist present; the site-specific endoscopy nurse is called in to assist the gastroenterologist and decontaminate the endoscope afterwards.

### RESULTS

A total of 240 endoscopies was performed from December 2007 to March 2011 as part of the weekend bleed service, of which 63 were admitted to QEII. Of these, 54 patients were transferred from QEII Hospital to Lister Hospital for endoscopy; nine had emergency endoscopy at QEII Hospital because they were medically unstable and were unsafe to transfer, and the remainder were admitted to the Lister Hospital in the first place (table 1). The transferred patients had a mean pre-endoscopy Rockall score of 2.5 (range 0–6), median age of 74.5 years, and an age range of 28–95 years. A total of eight of the patients transferred required therapeutic intervention for active bleeding. A breakdown of the pathology seen at endoscopy is provided in table 2.

**Table 1** Breakdown of endoscopies performed December 2007–March 2011

	Lister		
	QEII	Transfer from QEII	Admitted directly to Lister
Saturday	5	24	90
Sunday	4	30	87

QEII, Queen Elizabeth II Hospital.

**Table 2** Common findings of patients transferred from QEII to Lister Hospital (n=54)

Diagnosis	Number	Percentage
Duodenal ulcer	12	22.2
Oesophagitis	10	18.5
Gastritis	9	16.7
Angiodysplasia	7	13.0
Normal	6	11.1
Varices	5	9.3
Gastric ulcer	2	3.7
Cancer	1	1.9
Mallory Weiss tear	1	1.9
Failed oesophagogastroduodenoscopy	1	1.9

QEII, Queen Elizabeth II Hospital.

We were able to examine the medical records of 51 (of a total of 54) of the patients transferred. Despite our best efforts, medical records of three patients could not be located and thus were not examined. There was a total of three deaths within 30 days of endoscopy, but these were not felt to be associated with the transfer of the patients (table 3).

We analysed the length of stay of patients undergoing endoscopy at the weekend, stratified by intervention and outcome. We defined low-risk patients as those who were haemodynamically stable, had no drop in haemoglobin and had normal endoscopy. High-risk patients were defined as those with haemodynamic compromise, drop in haemoglobin, and possible requirement for transfusion, regardless of endoscopic findings. Based on these definitions, we identified three groups of patients with reduced hospital stay:

- Patients with low-risk AUGIB who were discharged at the weekend after endoscopy.
- High-risk patients who did not require therapeutic intervention. Our practice is to discharge such patients once they have been haemodynamically stable for 24–48 h post-endoscopy.

**Table 3** Cause of death in patients transferred for endoscopy

Age (years)	Rockall score	Endoscopic finding	Cause of death
90	6	Large bleeding duodenal ulcer. Unable to stop bleeding at endoscopy	Too frail for repeat endoscopy or surgery
86	4	Mallory Weiss tear	Patient well until discharge post-endoscopy. Re-admitted 1 week later with vomiting. Died from aspiration pneumonia
86	6	Normal endoscopy	Postmortem: bronchopneumonia and subdural haematoma

**Table 4** Early discharges facilitated by weekend endoscopy

Discharge	Number
Saturday endoscopy	
Same day	2
Post 24–48 h monitoring	6
Post 72 h intravenous proton pump inhibitor therapy	0
Sunday endoscopy	
Same day	0
Post 24–48 h monitoring	8
Post 72 h intravenous proton pump inhibitor therapy	3

- Patients who required 72 h of intravenous proton pump inhibitor (PPI) therapy after therapeutic intervention. It was assumed that the patients who required intervention would still have needed that intervention on the Monday morning and therefore still have required a further 72 h of intravenous PPI therapy following that.

Analysing the results, 19 of 51 patients (37%) had an early facilitated discharge (table 4).

## DISCUSSION

The growing evidence base for improved outcome and reduced length of stay with early access to endoscopy for AUGIB imparts an obligation on hospitals to improve access to an acute gastrointestinal bleed service for their patients. The logistics of this mean that NHS trusts need to consider different operational models to achieve appropriate skilled cover. Pooling resources together across multiple sites or even trusts is one such option. There are national guidelines to ensure the safe interhospital transfer of ill patients.<sup>9</sup> In our own trust we have several years experience of transferring patients between sites, and in this paper we have shown that it is safe and feasible to transfer patients with AUGIB who are haemodynamically stable.

Endoscopic therapy, in conjunction with high-dose PPI therapy, is the first-line treatment for AUGIB as it reduces the risk of re-bleeding, transfusion requirements and the need for surgery.<sup>10</sup> As discussed earlier, there is evidence of increased mortality from AUGIB during weekends (13% higher) and bank holidays (41% higher).<sup>3</sup> Patients admitted at the weekend have an increased risk of death, higher rates of surgical intervention, prolonged hospital stays, as well as a longer mean time to endoscopy.<sup>4</sup> Part of the difference in weekend mortality compared to weekdays is due to reduced medical staffing; however, delayed endoscopy at the weekend is also likely to play a role. The second UK-wide audit on AUGIB bleed has found a 25% reduction (10% in the initial audit, down to 7.4%) in mortality following endoscopy from 1993 to 2007.<sup>11</sup> While some of this improvement might be due to better inpatient management, the availability of endoscopic treatment modalities is also likely to have contributed to these improved figures.

However, to date no difference in mortality has been shown between hospitals with or without a formal out-of-hours endoscopy service.<sup>3</sup> The second national UK audit on the use of endoscopy in the management of AUGIB found in-hospital post-endoscopy mortality to be 21% higher for patients in hospitals without a formal out-of-hours endoscopy service, but this was not statistically significant.<sup>11</sup> The reason for this is likely to be multifactorial. First, in patients admitted with bleeding peptic ulcer disease, 80% of deaths have been attributed to non-bleeding causes, such as terminal cancer or multi-organ failure.<sup>12</sup> Second, in the UK, 13% of endoscopies are performed out of hours in units without a formal out-of-hours service, compared with 20% in units with a formal out-of-hours service.<sup>11</sup> It is likely that the out-of-hours endoscopies performed by endoscopists, out of good will, account for the lack of a discernable difference in mortality when comparing hospitals with and without formal out-of-hours services.

There is growing consensus that inadequate out-of-hours endoscopy services are contributing to patient mortality,<sup>5–7</sup> and there has been a drive in the UK to improve access to such services, as part of raising the standard in the care of patients with AUGIB.<sup>5–8</sup> Various guidelines, both British (British Society of Gastroenterology and National Institute for Health and Clinical Excellence) and American (American Society for Gastrointestinal Endoscopy), have recommended endoscopy to be performed within 24 h of admission.<sup>6, 13–15</sup>

A recent analysis by the National Clinical Guideline Centre has found that units with more than 330 presentations of AUGIB per year will find it cost effective to run an everyday endoscopy service. The cost saving is mainly due to reduced lengths of stay of those patients with low-risk AUGIB.<sup>16</sup> However, this does not take into account the possibility of performing routine endoscopies at the weekend as part of the service, which would generate further income.

In our hospitals, before the introduction of the out-of-hours service in late 2007, the gastroenterology consultants performed emergency endoscopies in the operating theatre when required. In addition to adhering to best practice guidelines outlined above, the setting up of the out-of-hours service has had multiple benefits in our trust. First, patients consistently receive timely emergency endoscopy. Second, there has been a reduction in disruption to the emergency operating theatre. Third, participation of endoscopy nurses ensures a better and safer experience for patients, and better endoscope decontamination. Fourth, a percentage of patients have been discharged safely from the hospital earlier, which has benefits for the patients and the hospital alike. Finally, performing elective upper and lower gastrointestinal endoscopy on Saturday and Sunday mornings has had the added

benefit of reducing waiting lists, as well as creating additional income for the trust, further justifying the initial expense required to set up an out-of-hours endoscopy service.

In this paper, we have discussed the setting up and running of our out-of-hours endoscopy service that involves interhospital transfer of patients. The number of patients in our retrospective audit is relatively small. However, there are few available data in this area, and these data suggest that our model is a safe and feasible blueprint for other units wishing to set up their own out-of-hours endoscopy service.

### What is already known on this topic

- ▶ Mortality from AUGIB is 13% higher at the weekends compared to weekdays.
- ▶ The difference in mortality is partly associated with lack of widespread out-of-hours endoscopy.
- ▶ National Institute for Health and Clinical Excellence guidelines advocate endoscopy within 24 h of admission for AUGIB.

### What this study adds

- ▶ It is safe to transfer medically stabilised patients to hospitals with out-of-hours endoscopy.
- ▶ Setting up an out-of-hours endoscopy service will reduce disruption to theatres and provide better experience for endoscopy staff as well as patients.
- ▶ An out-of-hours endoscopy service will result in reduced hospital stay for a proportion of patients.

### How might it impact on clinical practice in the foreseeable future

- ▶ It is safe and feasible for hospitals to pool resources together to set up an out-of-hours endoscopy service by transferring patients admitted with AUGIB.

**Contributors** BNS and MK analysed the results. BNS and SMG were the main authors of the text of the paper. All other authors worked on setting up the out-of-hours service, and also contributed text and suggestions to the paper.

**Competing interests** None.

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