Re-audit of upper endoscopy in Assiut University Hospital

Madiha M.H. El-Attar, Mohammed Z. Abu-Rhama, Nada Abu-AlNaga Mohammed

Department of Tropical Medicine and Gastroenterology, Faculty of Medicine, Assiut University, Assiut, Egypt

Correspondence to Nada Abu-AlNaga Mohammed, MSc, Department of Tropical Medicine and Gastroenterology, Faculty of Medicine, Assiut University, Assiut, Egypt. Postal Code 71515; Tel: +20 102 552 8268; e-mail: nada.mahmoud@med.aun.edu.eg

Received 16 January 2020
Revised 30 March, 2020
Accepted 29 September 2020
Published 23 February 2021

Journal of Current Medical Research and Practice
2021, 6:14–21

Background
Audit is an attempt to improve the quality of medical care by measuring the performance in relation to desired standards, whereas re-audit demonstrates improvements that have been made.

Patients and methods
A prospective study was performed through a medical audit of 100 patients at the endoscopy unit of El-Rajhi Hospital University between January and December 2017. Revision of upper endoscopy, including indications, preparations, and complications, was done.

Results
The mean age was 59 years. The most frequent comorbidities were liver cirrhosis (70%) and diabetes mellitus (25%). All patients were indicated for endoscopy, as the majority (70%) of patients required urgent upper endoscopy secondary to upper gastrointestinal tract bleeding in contrast to the previous study as 4% of patients were not indicated. There was an increase in the percentage of complications in our study owing to the increased percentage of postband ulcers (92%) in comparison with the previous study (90%).

Conclusion
Improvement in our practice was noticed after recommendations of the previous audit regarding preparation and indications. It is important that a re-audit takes place following the implementation of changes.

Keywords:
audit, re-audit, upper endoscopy

J Curr Med Res Pract 6:14–21

2357-0121

Introduction

The audit forms the system to improve the standards of clinical practice by evaluating current practice compared with standard guidelines. When necessary, changes are made to improve the quality of patient care. A re-audit can be used to confirm that the improvements are effective [1].

Clinical audit is defined as the clinical and systemic analysis of medical care, including the procedures used for diagnosis and treatment, the use of resources, the resulting outcome, and the patient's quality of life, to improve efficacy and efficiency of medical care [2].

The clinical audit provides a framework to improve the quality of patient care in a collaborative and systematic manner. When the clinical audit is carried out well, it allows the quality of care to be objectively reviewed within an approach that is supportive, developmental, and focused on improvement. Benefits of the clinical audit include the following [3]:

(1) Promotes and allows the expected practice.
(2) Provides education and training opportunities.
(3) Establishes relationships between doctors, clinical teams, and patients.
(4) It leads to improvements in the provision of services and patient outcomes.

The audit should be a quality improvement process, and therefore, having identified problems or deficiencies in the structures or processes or poor results, an action plan should be taken to improve the structures or the care process, as this should lead to an improvement in the result [4].

The action plan must include a review date and identify the person or people responsible for its implementation. Overall, 90% of audits with an action plan must be audited again [5].

The audit cycle demonstrates the steps involved in a complete audit. When a clinical audit reveals the need for improvements in service, it is important that a new audit is performed after the changes are implemented. Sometimes, several audits will be needed to improve service and 'close the cycle'[6].

The audit is a cycle that is formed from the following elements [7]:
(1) Choose the topic.
(2) Define criteria and standards, identify the required changes, and implement them.
(3) Collect the data.
(4) Evaluate performance according to criteria and standards.
(5) Action planning and re-audit.

Esophagogastroduodenoscopy (EGD) is the technology used to obtain standardized endoscopic images to diagnose diseases of the esophagus, stomach, and duodenum in a daily medical practice. Although upper endoscopy is a practical method for diagnosis, therapy, and follow-up, complications of performing a high digestive endoscopy can cause negative effects such as perforation, bleeding, cardiac arrhythmia, aspiration, and even a Mallory-Weiss tear [8].

Defects in our endoscopy unit during the performance of upper endoscopy were noticed in the previous audit that was done in 2013. There were defects in patients' preparations before upper endoscopy, particularly those with comorbidities such as cardiac and renal patients, especially with general anesthesia. Moreover, indications of upper endoscopy sometimes deviated from guidelines. All these defects were explained to the physicians in the endoscopy unit after performing that audit.

Patients and methods

Study design

This prospective study was carried out at Assiut University Hospital, a tertiary care teaching hospital, Assiut, Egypt, between January and December 2017.

Patients

Patients who had upper endoscopy, either therapeutic or diagnostic endoscopy, in the previous mentioned period were included.

Methods

A prospective study was performed through medical audit and 100 patients were included in this study, comprising 61 males and 39 females.
(1) Patients signed informed consent.
(2) IRB of the Assiut Faculty of Medicine approved the study (17101017).

Revision of upper endoscopy of the patients, including indications, preparations, comorbidities, findings in upper endoscopy, and interventions if present, was done. Complications after the upper endoscopy were reported.

(a) History was taken from the patients related to any drugs, including anesthetics, or taking any drugs, having bleeding problems, or taking blood-thinning drugs, such as warfarin (Coumadin). Medical history was also taken if they had heart problems, were pregnant, or had diabetic and were taking insulin. History of surgery or radiation treatments was also recorded.
(b) The patients should fast for 8 h before the procedure.
(c) Intravenous cannula was inserted.
(d) Intravenous third-generation cephalosporin was given in all cirrhotic patients presented with acute gastrointestinal tract (GIT) bleeding before upper endoscopy.
(e) Anesthesia: local anesthetic by 4% xylocaine solution was used for gargles before the procedures. Intravenous midazolam or propofol was given in a dose of 10–15 ml.
(f) In patients with fundal varices, histoacryl was used.
(g) Band ligation was performed in patients with esophageal varices by sets of bands.
(h) Adrenaline injection was used for bleeding ulcers.
(i) Patients were sent to recover for a minimum of 1 h on adequately staffed and equipped bedded areas adjacent to the endoscopy room.
(j) In our study, we tried to apply guidelines of the American Society for Gastrointestinal Endoscopy.
(k) Statistical analysis data were collected and analyzed using SPSS (Statistical Package for the Social Science, version 20; IBM, Armonk, New York, USA). Continuous data were expressed in the form of mean ± SD or median (range), whereas nominal data were expressed in the form of frequency (percentage).

Results

Characteristics of the studied patients

A total of 100 patients were included in the study. It was noticed that most patients were males (61%), whereas 39% of patients were females. The mean age of all enrolled patients was 59.13 ± 13.46 years, with a range between 16 and 88 years. It was noticed that 40 (40%) patients were 40–60 years and 30 (30%) patients were 60 years old or more, whereas only four patients were less than 20 years old (Figs. 1 and 2).

Comorbidities among study group

Table 1 shows comorbidities among the study group. The most frequent comorbidities were liver cirrhosis (70%) and diabetes mellitus (25%). Other comorbidities such

as hypertension, chronic kidney disease, ischemic heart disease, and cerebrovascular stroke were presented in 13 (13%), 10 (10%), five (5%), and two (2%) patients, respectively (Fig. 3).

Indications of upper endoscopy in studied patients

The majority (70%) of the studied patients required urgent upper endoscopy secondary to upper GIT bleeding, where 30% of patients presented with hematemesis, 24% of patients presented with melena, whereas both hematemesis and melena were presented in 16% of patients.

Elective upper endoscopy was performed in 30% of patients. It was noticed that seven patients came for variceal screening, whereas anemic manifestations presented in 9% of patients. Upper endoscopy was done secondary to persistent vomiting, recurrent epigastric pain, and dysphagia in 5, 5, and 4% of patients, respectively (Figs. 4 and 5).

Findings in upper endoscopy in studied patients

The most frequent findings in studied patients were gastroesophageal varices (55%) followed by gastritis (20%) and a gastroduodenal ulcer (8%). Gastric mass and duodenal mass were presented in five and three patients, respectively. Only two patients were diagnosed to have achalasia, whereas angiodysplasia was presented in 3 patients. Four patients had normal upper endoscopic findings (Fig. 6).

Different interventions in upper endoscopy in the studied patients

The majority (55%) of patients required band ligation and/or fundal injection, whereas no intervention was required in 18% of patients. Bleeding was controlled with adrenalin injection in 4% and 3% of patients, whereas those patients who presented with bleeding secondary to angiodysplasia had a session of argon plasma coagulation. Overall, two (2%) patients with achalasia were subjected to esophageal dilatation. A biopsy was taken in 55% of patients (Fig. 7).

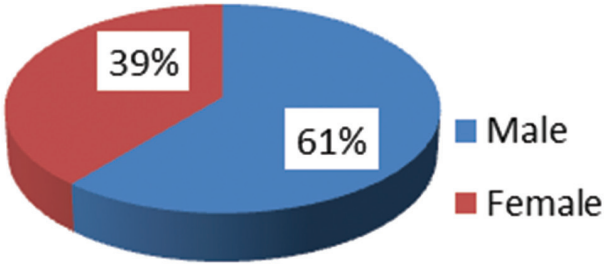
Hospital admission in the studied patients

Out of the studied patients, 75% of patients required hospital admission, with mean hospital stay of 2.01 ± 0.98 days (Fig. 8).

Complications in studied patients

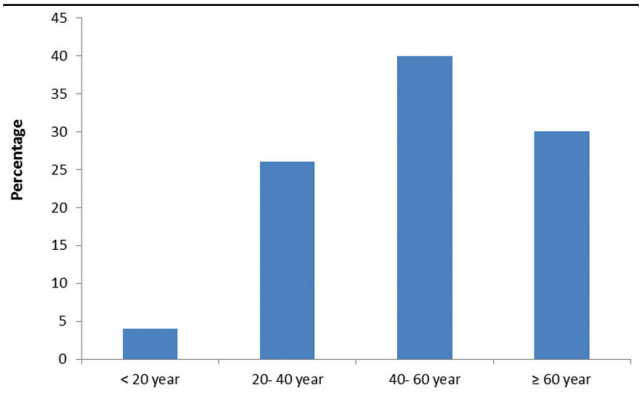
Generally, upper endoscopy was a safe procedure, where 90% of patients had no complications. However, 10% had complications in the form of postband ulcers in 6% of patients, syncope in 2% of patients, whereas cardiac

Figure 1



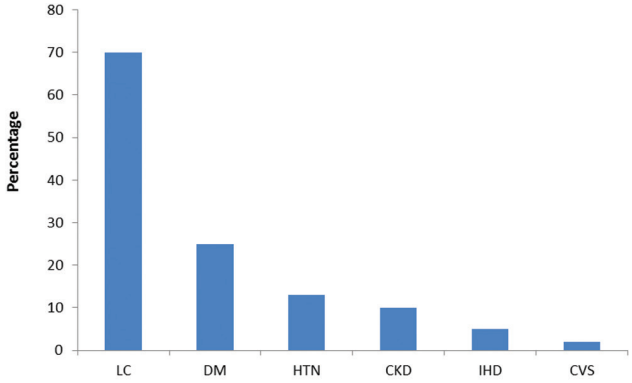
Sex distribution in the current study

Figure 2



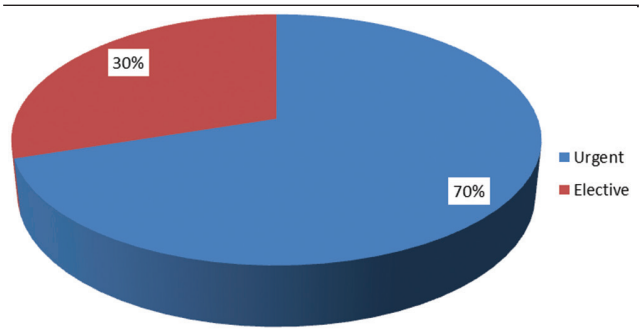
Age groups of studied patients.

Figure 3



Comorbidities among studied patient.

Figure 4



Indications of upper endoscopy.

arrest occurred in only one patient and was secured with resuscitation. Hypoxia was seen in one (1%) case (Fig. 9).

Comparison between our present practice and the standard guidelines in upper endoscopy in Table 2.

fx1

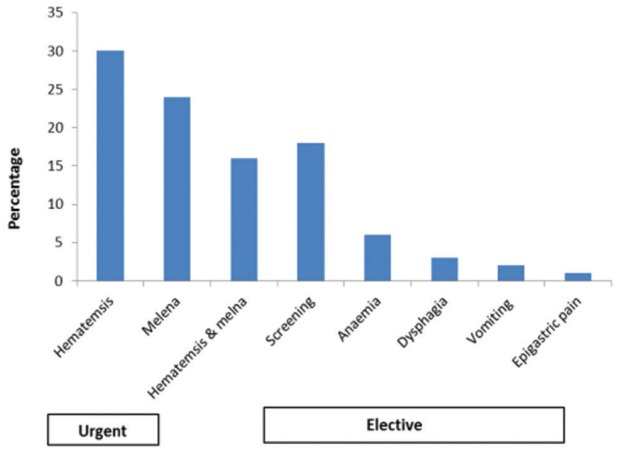
Change in our present practice in upper endoscopy in comparison with previous study in 2013 in Table 3.

Discussion

The results of a good audit should be disseminated both at the local level through the Strategic Health Authorities and at the national level whenever possible, and the development of web-based tools (in progress at this time) can help this tooling process to monitor orientation and technology evaluations [9].

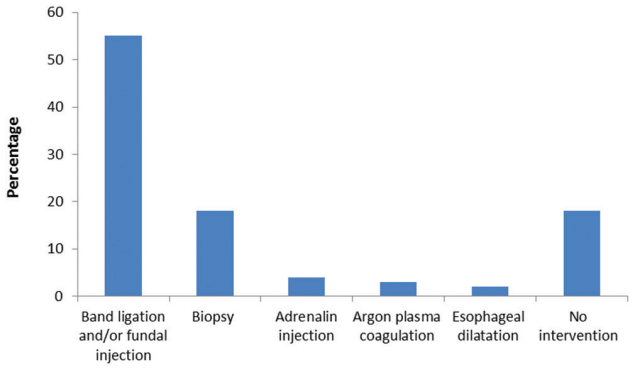
In our study at Assuit University, we included 100 patients who underwent upper endoscopy as a part of participation in the audit.

Figure 5



Different types of indications of upper endoscopy.

Figure 7



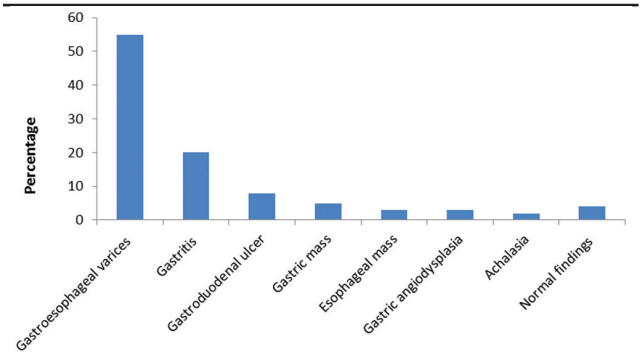
Different intervention in upper endoscopy.

The characteristics of the studied groups according to the sex showed 61 were males and 39 were females, with an age range between 16 and 88 years old, which is extended in comparison to the previous audit, which was between 16 and 72 years old. The extended age range in our study with a low percentage of complication is an indicator of a good preparation, selection, and monitoring of elderly patients during an upper endoscopy. By comparison, the complication rate for endoscopy is reported to be lower in younger patients; however, EGD tends to induce cardiac and respiratory stress in elderly patients [10].

In our endoscopy unit, preparation was done before the upper endoscopy by identification of the patients, procedure type, and indications (by endoscopy request form, which includes name, hospital registration number, date of procedure, brief history, type of endoscopy, indication, and comorbidities).

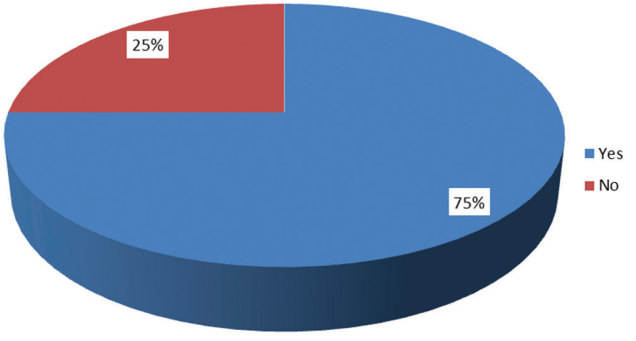
Informed written consent was obtained from each patient before the procedure. There is considerable international variation in the procedure for obtaining informed consent, as found in the survey of members of the European Society of Gastrointestinal Endoscopy. Before the endoscopy, patients should be provided with written information in a timely fashion and in a form understandable to the patient [11].

Figure 6



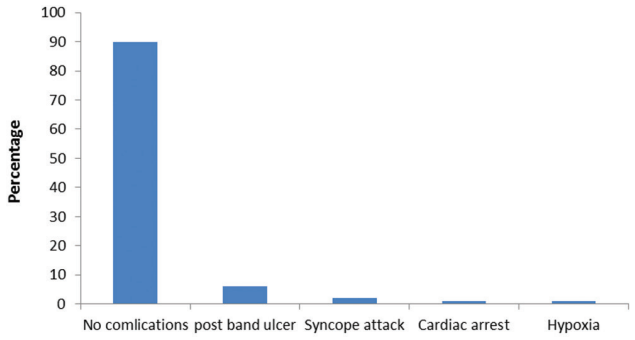
Findings in upper endoscopy.

Figure 8



Hospital admission in studied patients.

Figure 9



Complications in studied patients.

All patients were fasting for 8 h before the procedure, and an intravenous cannula was inserted. Intravenous access with a permanent plastic cannula until the patient has fully recovered must be established before the procedure [12].

In our endoscopy unit, continuous intravenous access remains *in situ* for long enough to be useful as emergency access after the procedure. Preendoscopic preparation for sedation and monitoring, including intravenous access, should be followed, in case that patient does not tolerate the procedure or develops a cardiopulmonary unplanned event, and sedation is ultimately required [13].

Intravenous third-generation cephalosporin was given in all cirrhotic patients presented with acute GIT bleeding before upper endoscopy as recommended by ASGE guidelines.

Regarding anesthesia, local anesthetic by 4% xylocaine solution was used for gargles before the procedures. Intravenous midazolam or propofol was given in a dose of 10–15 ml. Patients were attached with monitoring devices (as blood pressure cuffs, pulse oximeter, and ECG), and fitness was done for all patients undergoing the intervention (as argon photocoagulation).

Pharyngeal anesthesia has been routinely used during endoscopy worldwide for many years, but its effectiveness in improving endoscopy tolerance has not been definitively proven. Many studies have shown a beneficial effect of pharyngeal anesthesia in terms of the patient's tolerance to superior endoscopy, but other studies reported no benefits to the patient or the endoscopist [14].

A meta-analysis published in 2006 summarized these trials and concluded that pharyngeal anesthesia before endoscopy improves the ease of endoscopy and patient tolerance [15].

Table 1 Comorbidities of studied patients

Data	***N*=100 [*n* (%)]**
Liver cirrhosis	70 (70)
Diabetes mellitus	25 (25)
Hypertension	13 (13)
Chronic kidney disease	10 (10)
Ischemic heart disease	5 (5)
Cerebrovascular stroke	2 (2)

The viscous lidocaine solution and lidocaine spray are usually used for upper endoscopy. Recently, lidocaine lozenge has been tried for use in EGD procedure. Mogensen *et al.*[16] evaluated the effect and acceptance of a lidocaine lozenge compared with a lidocaine viscous oral solution as pharyngeal anesthesia before the EGD. They concluded that the lozenge could reduce gag reflex and patients' discomfort and improve patients' acceptance during procedure.

Good preparation for emergency situations was present, and there was at least one member of the team with certification on advanced cardiac life support. All equipment and medications necessary to perform emergency resuscitation, along with adequate accessories and devices (injector, coagulator, hemoclips, etc.) were available at any time during the endoscopic procedure.

In our study, 70% of cases underwent urgent upper endoscopy (in comparison with only 50% in the previous audit). Hematemesis alone accounted for 30% of cases, melena alone 24%, and both 16%; hematemesis and melena were the most frequent indication for an upper endoscopy. The most common causes of hematemesis in our study were bleeding varices (55%), severe gastritis (20%), and peptic ulcer (8%).

Upper gastrointestinal bleeding is a major public health problem. Its prevalence is ~150 per 100 000 adults per year [17].

This condition is the most common emergency medical admission for gastroenterology worldwide and has significant hospital mortality of 10%, which has remained unchanged in the past 30 years, despite modern diagnostic and treatment methods [18].

Variceal bleeding represents 60–65% of the bleeding episodes in patients with cirrhosis [19].

The outcome for patients with variceal hemorrhage is closely related to the severity of the underlying liver disease. The 6-week mortality with each episode of variceal hemorrhage is ~15–20%, ranging from 0% among patients with Child–Pugh class A disease to ~40% among patients with Child–Pugh class C [20,21].

Table 2 Comparison between our present practice and the standard guidelines in upper endoscopy

Aspect of comparison	Standard guidelines	Our present practice	Percentage of adherence to guidelines (%)
Preparation 1) Identification of patient, procedure type, and indication	hospital registration number, name, social security number, date of birth, etc., type, indication	all patients had endoscopy request form that include name, hospital registration number, date of procedure, brief history, type of endoscopy, indication and comorbidities	100%
2) Informed consent	recommendable to disclose the following: diagnosis, procedure, indication, possible complications Date, time, name, and signature legibly written by patient and physician.	A written informed consent was taken from every patient before the procedure.	100%
3) History taking& examination	important both for patients with no sedation or with sedation/analgesia, especially important if moderate or deep sedation.	History was taken from all the patients before the procedure and examination was recorded in endoscopy sheet.	100%
4) Fasting	Fasting for at least 8 h is domestically recommended.	All Patients were fasting for 8 hours before the procedure.	100%
5) Antibiotic prophylaxis	antibiotics prophylaxis is generally not recommended, but it is necessary in cirrhotic patients and acute GI bleeding.	I.V third generation cephalosporin was given in all cirrhotic patients	100%
6) anesthesia	Using an appropriate adjunctive agent in combination with conventional sedative drugs in select clinical circumstances.	I.V Midazolam or propofol were given but complications occurred in 4% of patients .	96%
7) Patient monitoring devices	If a patient is to undergo endoscopic procedures with moderate or deep sedation, patient status should be monitored accordingly.	patient monitoring devices (as blood pressure cuffs , pulse oximeter, ECG were used.	100%
8) Preparation for emergency situations	At least one member of the team should have current certification on advanced cardiac life support. All equipment and medications necessary to perform emergency resuscitation should be available.	There was at least one member of the team with certification on advanced cardiac life support. All equipment and medications were available.	100%
9) diagnostic indications	*Persistent upper abdominal despite an appropriate trial of therapy.	1% of cases 100%	
	*Upper abdominal symptoms associated with other symptoms or signs suggesting structural disease (eg, anorexia and weight loss) or new-onset symptoms in patients older than 50 years of age.	2% of cases 100% 3% of cases 100%	
	*Dysphagia or odynophagia	3% of cases 100%	
	*Persistent vomiting	Not done zero%	
	* Familial adenomatous polyposis syndromes.	70% of cases 100%	
	*GI bleeding	6% of cases 100%	
	*chronic blood loss and for iron deficiency anemia	18% of cases 100%	
	*screening for varices.		
10) therapeutic indications	*Treatment of bleeding lesions such as ulcers, varices, tumors, vascular abnormalities .	62% of cases had 100% (band ligation or adrenaline injection or APC	
	*Placement of feeding or drainage tubes .	Not done zero%	
	*Dilation and stenting of stenotic lesions	2% of cases 100%	
	* Endoscopic therapy of intestinal metaplasia.	Not done zero%	
	* When sampling of tissue or fluid is indicated.	Biopsy taking was done in 18% of cases.	100%

The most common causes for elective upper endoscopy were screening for gastroesophageal varices (18%) and anemic manifestations (6%). Approximately 25% of people worldwide have anemia. Iron deficiency is the most common cause (50% of all anemias) [22].

Iron-deficiency anemia occurs in 25% of adult men and postmenopausal women in the developed world. It is a common cause of referral to gastroenterologists (4–13% of referrals) [23].

Blood loss from the GIT is the most common cause in adult men and postmenopausal women. Asymptomatic gastric carcinoma may present with IDA, and seeking these conditions is a priority in patients with IDA [24].

All patients were indicated in our study (70% urgent and 30% elective), with no patient not indicated (there were 4% not indicated patients in the previous study), which indicate a good selection of patients.

Regarding hospital admission and stay in our endoscopy unit in the studied patients, 75 (75%) patients required hospital admission, with mean hospital stay of 2.01 ± 0.98 days. Generally, upper endoscopy was a safe procedure, where 90 (90%) patients had successful procedures. Complications occurred in ~10 (10%) cases of the studied patients, postband ulcers were seen in 6% (six cases), whereas syncope and fainting attacks were present in 2% (two cases), cardiac arrest presented in 1% (one case), and hypoxia in 1% (one case).

There is a mild increase in the percent of complications in our study owing to an increase in percent of postband ulcers, which requires revision of training of endoscopists and banding sets quality.

It has been estimated that ulcerations secondary to endoscopic variceal sclerotherapy occur in 50–78%. Significant bleeding can occur in 6% of these patients [25].

Esophageal ulcer formation is seen in 5–15%, and there is a lower tendency for ulcer-related bleeding than endoscopic variceal sclerotherapy [26].

Cardiorespiratory complications account for ~50% of potentially serious morbidity cases and ~50% of all procedure-related deaths associated with the GIE procedure. In many cases, these complications are a direct or indirect consequence of elderly or at-risk patients being given unnecessarily high doses of sedative and analgesic drugs [27].

Despite the effectiveness of conscious sedation shown in our study, we think it should be avoided whenever possible in the clinical practice.

The incidence of sedation-related complications associated with a GIE procedure is relatively low. Risk factors for these complications are age more than 60 years, high American Society of Anesthesiologists physical status, inpatient status, and the involvement of a trainee in the procedure [28].

Conclusion

An audit involves improving the quality of patient care by looking at current practice and modifying it where necessary. It provides a framework to enable changes to be made to improve the process, being an essential component of professional practice, and can improve the quality and effectiveness of healthcare. Improvement in our practice is noticed after recommendations of the previous audit.

Table 3 Change in our present practice in upper endoscopy in comparison with previous study in 2013

Aspect of comparison	Our present practice	Previous pra ctice in 2013
Age (years)	59.13±13.46	48.70±13.62
Range	16-88	16-72
Indications		
Urgent	70 (70%)	50 (50%)
Elective	30 (30%)	46 (46%)
Screening for varices	18 (18%)	20 (20%)
Anemic manifestations	6 (6%)	4 (4%)
Dysphagia	3 (3%)	4 (4%)
Persistent vomiting	2 (2%)	4 (4%)
Recurrent epigastric pain	1 (1%)	14 (14%)
Not indicated	-	4 (4%)
Hospital admission		
Yes	75 (75%)	75 (75%)
No	25 (25%)	25 (25%)
Complications		
No complications	90 (90%)	92 (92%)
Post band ulcers	6 (6%)	3 (3%)
Syncope attack	2 (2%)	3 (3%)
Cardiac arrest	1 (1%)	1 (1%)
Hypoxia	1 (1%)	1 (1%)

It is important that a re-audit takes place following the implementation of changes. Further changes may then be required, leading to additional re-audits. Sometimes, it will take several re-audits to improve service.

Recommendations

(1) Further studies are necessary to identify the patients who are likely to tolerate diagnostic gastroscopy without sedation, and activation of the role of an education provider and communication with the patient should be done. Judicious use of conscious sedation with appropriate monitoring equipment may help control the rate and severity of complications.
(2) Postband ulcer occurrence and failure to control bleeding can be decreased by efficient medical treatment, resuscitation before endoscopy, and by more training of endoscopists.
(3) Hospital stay can be decreased through strict follow-up of patients after endoscopy and good selection of patients undergoing anesthesia. This will have a great effect on decreasing the cost.
(4) After an agreed period, the audit should be repeated. The same strategies for identifying the sample, methods, and data analysis should be used to ensure comparability with the original audit. The re-audit should demonstrate that the changes have been implemented and that improvements have been made.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Mitchell IA, Antoniou B, Gosper JL, Mollett J, Hurwitz MD, Bessell TL. A robust clinical review process: the catalyst for clinical governance in an Australian tertiary hospital. Med J Aust 2008; 189:451–455.
2. Khurram M, Khaar HB, Hasan Z, Umar M, Javed S, Asghar T, *et al*. A 12-year audit of upper gastrointestinal endoscopic procedures. J Coll Physicians Surg Pak 2011; 13:321–324.
3. Nahm ML, Pieper CF, Cunningham MM. Quantifying data quality for clinical trials using data capture electronic. PLoS ONE 2008; 3:e3049.
4. Jamtvedt G, Young JM, Kristoffersen DT, Thomson O'Brien MA, Oxman AD. Audit and feedback: effects on professional practice and health care outcomes. Cochrane Database Syst Rev 2004; 11:516–522.
5. McKay-Brown L, Bishop N, Balmford J, Borland R, Kirby C, Piterman L. The impact of a GP clinical audit on the provision of smoking cessation advice. Asia Pacific Fam Med 2008; 7:4.
6. Jonathan Potter D M, Claire Fuller MA, Martin Ferris. Local clinical audit: handbook for physicians. (2010).
7. Hunyinbo K, Fawole AO, Sotiloye OS, Otolorin EO. Evaluation of criteria-based clinical audit in improving quality of obstetric care in a developing country hospital. Afr J Reprod Health 2009; 12:59–70.
8. Ginzburg L, Greenwald D, Cohen J. Complications of endoscopy. Gastrointestinal endoscopy. Clin N Am 2007; 17:405–432.
9. Rehmani R, Amatullah AF. Quality improvement program in an emergency department. Saudi Med J 2008; 29:418–422.
10. Zafar HM, Harhay MO, Yang J, Armstron K. Adverse events following computed tomographic colonography compared to optical colonoscopy in the elderly. Prev Med Rep 2014; 1:3–8.
11. Demosthenous N, St Mart JP, Jenkins P, Chappel A, Cheng K. Cognitive function in patients undergoing arthroplasty: the implications for informed consent. Adv Orthop 2011; 2011:346161.
12. Ved P, Coupe T. Improving prescription quality in an in-patient mental health unit: three cycles of clinical audit. Psychiatr Bull R Coll Psychiatr 2007; 31:293–294.
13. Cadoni S, Falt P, Gallittu P, Liggi M, Mura D, Smajstrla V, *et al*. Water exchange is the least painful insertion technique and increases completion of unsedated endoscopy. Clin Gastroenterol Hepatol 2015; 13:1972–1980.
14. Heuss LT, Hanhart A, Dell-Kuster S, Zdrnja K, Ortmann M, Beglinger C, *et al*. Propofol sedation alone or in combination with pharyngeal lidocaine anesthesia for routine upper GI endoscopy: a randomized, double-blind, placebo-controlled, non-inferiority trial. Gastrointest Endosc 2011; 74:1207–1214.
15. Evans LT, SaberiS, Kim HM, Elta GH, Schoenfeld P. Pharyngeal anesthesia during sedated EGDs: is 'the spray' beneficial? A meta-analysis and systematic review. Gastrointest Endosc 2006; 63:761–766.
16. Mogensen S, Treldal C, Feldager E, Pulis S, Jacobsen J, Andersen O, Rasmussen M. New lidocaine lozenge as topical anesthesia compared to lidocaine viscous oral solution before upper gastrointestinal endoscopy. Local Reg Anesth 2012; 5:17–22.
17. Hopper AD, Sanders DS. Upper GI bleeding requires prompt investigation. Practitioner 2011; 255:15–19.
18. Amitrano L, Guardascione MA, Manguso F, Bennato R, Bove A, DeNucci C, *et al*. The effectiveness of current acute variceal bleed treatments in unselected cirrhotic patients: refining short-term prognosis and risk factors. Am J Gastroenterol 2012; 107:1872–1878.
19. Garcia-Tsao G, Sanyal AJ, Grace ND, Carey W. Practice Guidelines Committee of the American Association for the Study of Liver Diseases; Practice Parameters Committee of the American College of Gastroenterology. Prevention and management of gastroesophageal varices and variceal hemorrhage in cirrhosis. Hepatology 2007; 46:922–938.
20. Abraldes JG, Villanueva C, Bañares R, Aracil C, Catalina MV, Garaci-Pagan JC. Hepatic venous pressure gradient and prognosis in patients with acute variceal bleeding treated with pharmacologic and endoscopic therapy, Spanish Cooperative Group for Portal Hypertension and Variceal Bleeding. J Hepatol 2008; 48:229–236.
21. Bosch J, Thabut D, Albillos A, Carbonell N, Spicak J, Massard J, *et al*. Recombinant factor VIIa for variceal bleeding in patients with advanced cirrhosis: a randomized, controlled trial. Hepatology 2008; 47:1604–1614.
22. Eichner ER. Anemia in athletes, news on iron therapy, and community care during marathons. Curr Sports Med Rep 2018; 17:2–3.
23. World Health Organisation. Worldwide prevalence of anaemia. Geneva, Switzerland 1993–2005. WHO; 2008.
24. James MW, Chen CM, Goddard WP, Scott BB, Goddard AF. Risk factors for gastrointestinal malignancy in patients with iron-deficiency anaemia. Eur J Gastroenterol Hepatol 2005; 17:1197-203.
25. Seewald S, Ang TL, Imazu H, Naga M, Omar S, Groth S, *et al*. A standardized injection technique and regimen ensures success and safety of N-butyl-2-cyanoacrylate injection for the treatment of gastric fundal varices (with videos). Gastrointest Endosc 2008; 68:447–454.
26. Dell'Era A, de Franchis R, Iannuzzi F. Acute variceal bleeding: pharmacological treatment and primary/secondary prophylaxis. Best Pract Res Clin Gastroenterol 2008; 22:279–294.
27. Amornyotin S. Sedation and monitoring for gastrointestinal endoscopy. World J Gastrointest Endosc 2013; 5:47–55.
28. Frieling T, Heise J, Kreysel C, Kuhlen R, Schepke M. Sedation-associated complications in endoscopy – prospective multicentre survey of 191142 patients. Z Gastroenterol 2013; 51:568–572.