# 1. INTRODUCTION

## INTRODUCTION

The original gastrointestinal endoscopes were hollow reeds or bamboo canes that were illuminated by candles. These developments have been attributed to both the ancient Greeks and the Egyptians. However, the precise origin of endoscopy remains in doubt although Hippocrates was responsible for the first proctoscopy recorded in 370 BC.

The subsequent development was slow. The next major advancement was the rigid sigmoidoscope in 1795 by Bozzini, followed by the rigid oesophagoscope in 1868 by Kussaiaul. These instruments were very primitive in comparison with those in use today, and only allowed a limited examination. One of the major limitations was a suitable light source but this was overcome, in part, by Edison in 1890 who was able to make bulbs small enough to use inside the endoscope. This was followed by the discovery that glass fibres could transmit light by Baird in 1928.

The other limitation was scope rigidity. A ‘semi-flexible’ gastroscope was developed in 1932, followed in 1950 by the ‘gastrocamera’. This was superseded in 1957 by the flexible gastroscope developed by Hirchowitz and in 1963 the flexible sigmoidoscope developed by Overholt, both using optical fibres to connect the distal image lens to the proximal viewing lens that magnified the image for the endoscopist.

Diagnostic endoscopy was now a viable, valuable, clinical procedure. The only omission was full colonoscopy, which finally occurred in 1971 and was performed by Deyhle. Crucial, rapid developments included channels through the length of the scope that would allow air injection to distend the lumen, suction (to remove secretions), a water jet to clean the image lens, and mucosal biopsies. The potential of the biopsy channel was exploited rapidly, and numerous therapeutic procedures followed – including the first snare polpectomy by Niwa in 1970, and the first sphincterotomy for common bile duct stones in 1974.

The construction of the endoscope ensured that only the endoscopist saw mucosal images, and trainees could only view the image by adding a teaching aid to the endoscope. However, this resulted in a poor view of the mucosa for both teacher and trainee, and significantly increased the weight of the endoscope.

The development of video endoscopy by Welch-Allyn in 1983, produced high resolution images that ensured the territory previously the domain of the endoscopist could be seen by trainees, assistants, and observers.

The aim of this study is to improve the quality of therapeutic gastrointestinal endoscopy services in the future by critically appraising information from the notes of patients who have died during or following endoscopy. It is hoped that the intended benefits will include:

- fewer inappropriate procedures
- lower morbidity and mortality
- improved training
- recognition of poor performance
- reduced litigation
- better data collection.

Therapeutic gastrointestinal (GI) endoscopy is a common procedure. From Hospital Episode Statistics (HES) it has been established that in NHS hospitals in England, Wales and Northern Ireland in 2002/03 approximately 136,000 such procedures were performed[1]. Deaths reported following these procedures represented 3% of cases and it is therefore important that data in this report are taken in context. As a guide the mortality data for the four different GI therapeutic endoscopies covered in this report is summarised in Table 1. These figures have been calculated using data obtained from Hospital Episode Statistics (HES), which includes NHS data from Trusts in England only. However, this is representative of the majority (94%) of the data obtained from England, Wales and Northern Ireland.

**Table 1. Mortality data for therapeutic endoscopies – 2002/03**

| Procedure type | Number of deaths | Total number of procedures | Mortality % |
|---|---|---|---|
| PEG | 986 | 16,648 | *6* |
| ERCP | 381 | 23,606 | *2* |
| Upper GI | 2,200 | 47,931 | *5* |
| Lower GI | 102 | 40,378 | *<1* |
| **Total** | **3,669** | **128,563** | ***3*** |

**Legend**

PEG = Percutaneous endoscopic gastrostomy

ERCP = Endoscopic retrograde cholangiopancreatography

Anecdotally, it is believed that there is a significant amount of under-reporting of procedures, as many take place in an outpatient setting and these data are not recorded as part of the HES dataset; hence mortality may be overestimated. In addition, deaths following discharge from hospital are not captured by HES and this would tend to lead to an underestimate of mortality. These factors are both likely to affect the quoted mortality rates.