Radiology of the Stomach and Duodenum

With Contributions by

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Foreword by

A. L. Baert

With 322 Figures in 588 Separate Illustrations, 129 in Color and 9 Tables
To my wife

*Jackie*

for all her patience
during the preparation of this book

**ALAN H. FREEMAN**

To my son

*Pier*

and my husband

*Gezim*

**EVIS SALA**
Foreword

Notwithstanding the major contributions of endoscopy in the diagnosis and management of disorders of the stomach and the duodenum, radiology still has an important role in specific disease settings.

This volume provides up to date information on multimodality imaging of this anatomic section of the upper gastrointestinal tract within the framework of a multidisciplinary approach.

The editors, A.H. Freeman and E. Sala, judiciously selected the topics and were very successful in engaging the help of several other internationally recognised experts in gastrointestinal radiological imaging. The book comprehensively covers all main areas of interest, is superbly illustrated and the references include the most important recent publications in the field.

I am confident that this outstanding volume will find a great interest from general as well as specialised gastrointestinal radiologists but also from gastroenterologists and abdominal surgeons, who want to update their knowledge and abilities on the actual value of radiological imaging for patients with stomach or duodenal disorders. I hope that it will meet the same success as the previous volumes in our series.

Leuven

Albert L. Baert
Following Roentgen's discovery of X-rays, early experimenters quickly realised that this new technology held promise for investigating the hitherto unknown area of the gastrointestinal tract. Only 1 year after the publication of Roentgen's paper, W. Becher fed lead subacetate to a guinea pig and thus performed probably the first contrast study of a living stomach. Studies on humans soon followed, with Roux and Balthazard reporting their findings using bismuth subnitrate as a contrast agent in 1897. Herman Rieder in 1904 was the first to standardise the gastric examination, using as a contrast agent a mixture of 40 g of bismuth subnitrate mixed with gruel – henceforth known as the “Rieder meal”. However, it was realised that bismuth subnitrate had toxic side effects so investigators had to search for another form of contrast agent. They soon realised that barium sulphate, a naturally occurring mineral, possessed the ideal parameters of inertness, non-absorption from the gastrointestinal tract and excellent X-ray diffraction properties, which made it a perfect contrast agent for opacifying the upper GI tract. Its potential use had been suggested by Walter Cannon but it was Bachem and Gunter in 1910 that first described the use of barium sulphate in the stomach, and thus was borne the barium meal. Modifications occurred over the years, particularly with the introduction of double contrast, in an attempt to provide better delineation of the mucosal surface. Although the principle of double contrast in the colon had been first advocated by Fischer in 1923, its use in the stomach was slow to catch on in the Western world. The major stimulus for double contrast studies came from Japan in the 1960s, when a population screening programme was started to detect early gastric cancer – a condition with a very high prevalence in Japan. Hikoo Shirakabe, in particular, popularised the technique which requires the adherence of a thin film of high density barium sulphate to the gastric mucosa whilst the stomach is inflated with gas – usually CO₂. Improvements in barium preparations, including the addition of numerous gums and anti-flocculating agents, meant that by the late 1970s excellent mucosal detail could be demonstrated of the entire stomach and duodenum. And then along came flexible endoscopy, with its ability not only to see all the mucosa in glorious technicolour, but also to take biopsies of any suspicious or doubtful lesion. Here was a simple outpatient procedure requiring minimal sedation and within a decade the barium meal virtually died. However, conventional examination of the upper GI tract is still performed, although now the indications are different – often for function as well as morphological detail. New indications, such as studying the stomach after surgery for morbid obesity, have come into vogue and are likely to increase with the obesity epidemic in the Western world. It should also be remembered that endoscopy
is not infallible – a point addressed in Chapter 4 – and that there are still occasions when a patient cannot or will not tolerate an endoscopy.

Whilst demand for conventional radiology of the stomach has substantially dropped, aided by the discovery of Helicobacter pylori and its relationship to peptic ulcer disease, new technology has introduced a host of indications for radiological imaging of the stomach and duodenum. This particularly applies to CT with the subsequent development of multidetector CT (MDCT). Early CT rapidly proved its worth in staging gastric carcinoma, particularly in the sphere of distant spread to nodes and the liver. Delineation of the wall of the stomach, however, proved difficult both because of duration of scan time as well as lack of fine detail. These problems have been largely overcome with MDCT, which can now offer exquisite detail of the gastric wall acquired in the space of a few seconds. Very fine detail of the distinction between the mucosa and submucosa can still only be achieved by the use of endoscopic US as is outlined in Chap. 8. It is interesting to speculate as to whether or not CT will eventually have this capability or will MRI possibly supersede both, aided by its real time capabilities. The latter clearly takes the radiologist into the role of functional studies, a sphere up to now dominated by Nuclear Medicine examinations. Radiological intervention in the stomach and duodenum is also growing in importance and whilst it is helpful to have endoscopic expertise, this is not essential, as is shown in Chapter 11.

Finally, it goes without saying that accurate interpretation of radiological images (however they are acquired) requires a full knowledge of pathological processes and the way that they affect the organ. The principle of radiologic/pathologic correlation is now well established, but it is always helpful to remind ourselves of the macroscopic changes and how they come about from different disease processes. This we have attempted to do in Chapter 2.

In conclusion, we would like to thank Prof. A. Baert for entrusting us with the preparation of this project in the Medical Radiology series, and our particular thanks go to all our authors for contributing to this volume. We hope that it will provide useful and informative reading for any radiologist with an interest in the stomach and duodenum. Finally we wish to thank Ms Ursula Davis, Mr Kurt Teichmann and all the production team at Springer, whose tremendous help and expertise brought the project to fruition.

Cambridge

Alan H. Freeman
Evis Sala
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