



General Surgery Update: Liver Surgery

Cardiology Institute & Greenlane Medical Specialists GP
Symposium
11 February 2023

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History and evolution

1500s - Anatomy

- Liver and biliary anatomy in Renaissance Italy.

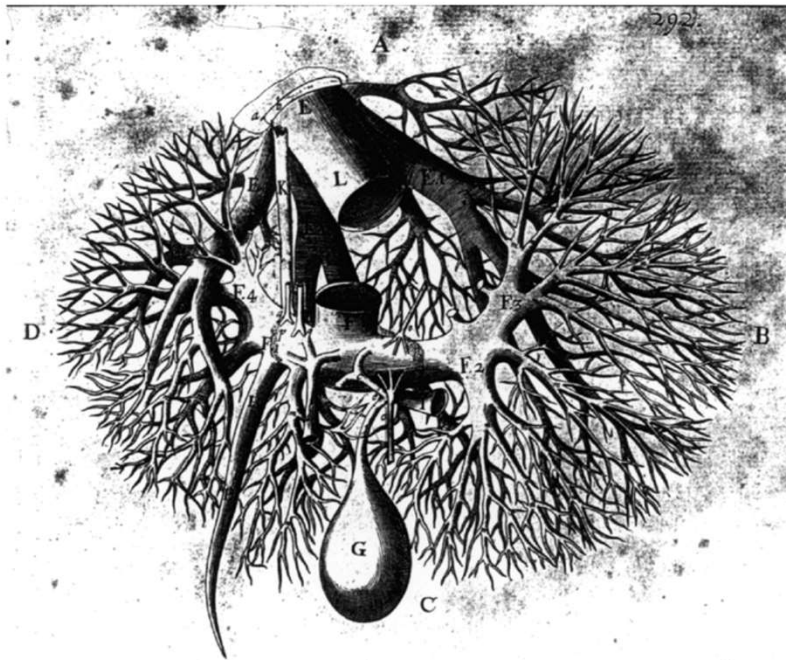
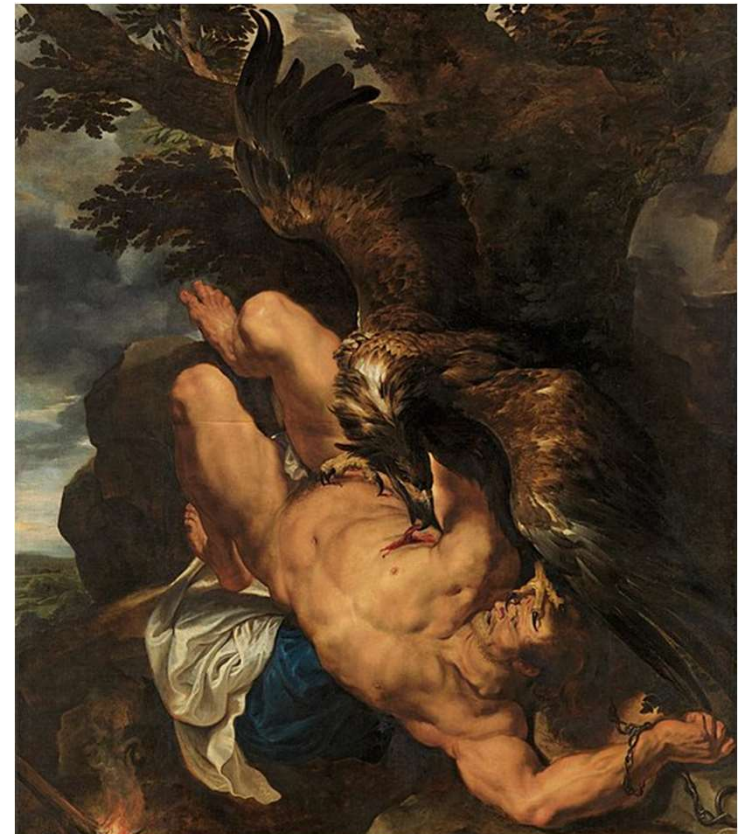


FIGURE 2. Illustration of the vasculature of the liver. From Glisson F, 1654: *Anatomia Hepatis*.



Prometheus Bound
1611
Peter Paul Rubens

History and evolution

Mid 1800s - Anaesthesia and antisepsis

- General anaesthesia - Warren and Morton 1846
- Handwashing - Ignaz Semmelweis 1847
- Aseptic surgery and handwashing - Joseph Lister 1865
- Blood transfusion - James Blundell 1818, ABO blood grouping Karl Landsteiner 1901



Early general anaesthesia (Morton and Warren)
in Boston using ether, October 1846

History and evolution

Late 1800s - Birth of liver surgery

- German surgeon Carl Langenbuch
 - First cholecystectomy in 1882.
 - First planned liver resection in 1888
- Further anatomical studies of liver by Rex (1888) and Cantlie (1897) allowed better understanding of intrahepatic anatomy and identification of planes that allow safer resection



Carl Langenbuch

History and evolution

1950s-60s - growth of liver surgery

- Major hepatectomies performed in USA
- Seminal anatomical studies in the 1950s by French surgeon and anatomist Claude Couinaud lead to modern numbering of liver segments



Claude Couinaud

History and evolution

1970s - The explosion of diagnostic modalities

- Discovery of xrays by Willem Roentgen in 1895
- 1971 - Godfrey Hounsfield performed first CT scan (head) in London
- 1977 - Raymond Damadian performed the first body MRI (thorax) in New York
- 1977 - development of CT and USS liver
- 1970s - development of ERCP and PTC
- 1988 - hepatic arteriography

History and evolution

1980s-2000s - Modern liver surgery

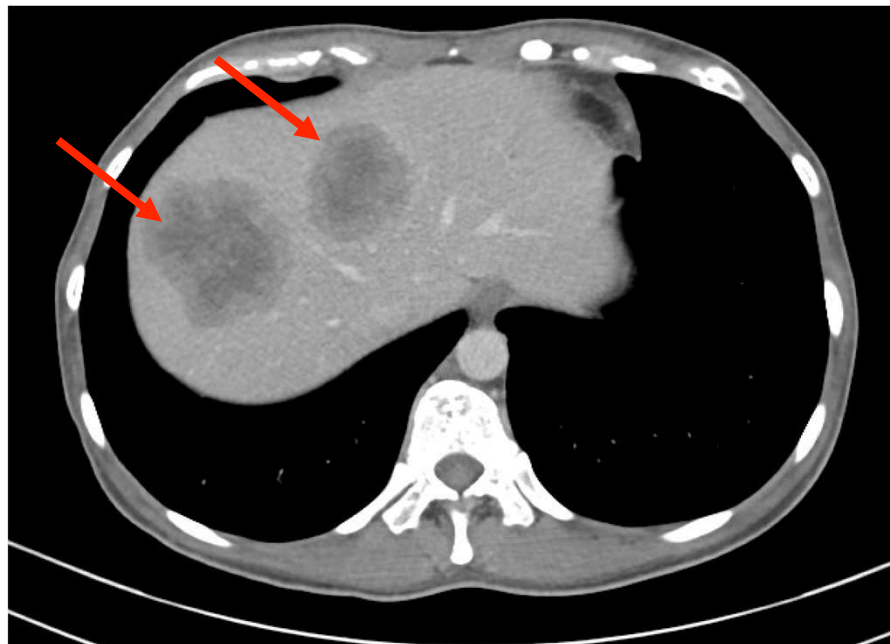
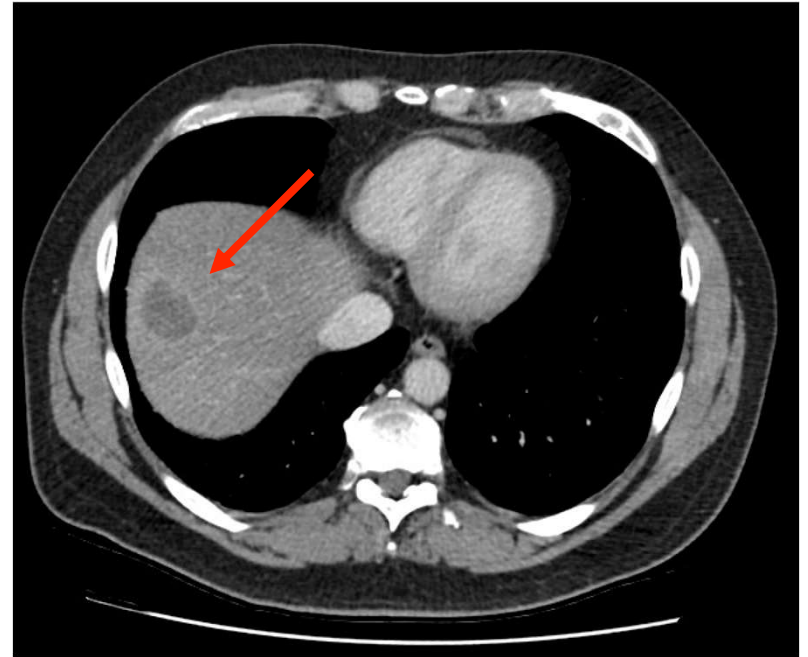
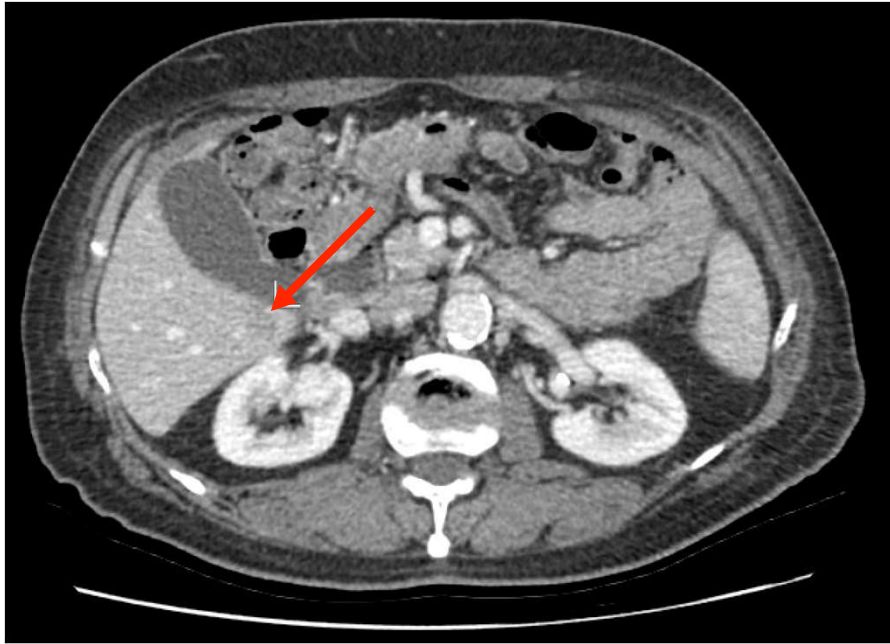
- Techniques for liver transection developed - waterjet (1982), CUSA (1984), harmonic scalpel (1988)
- Low-CVP anaesthesia in mid 1990's reduced venous bleeding
- Development of intraoperative ultrasound enabled accurate segmental and subsegmental resections in the 1980s
- By the early 2000s, the morbidity and mortality with liver resection has decreased dramatically, leading to more widespread practice
- Various ablations technique developed - Cryoablation (1990s), RFA (2000s), Microwave (2010s)

History and evolution

Further advances

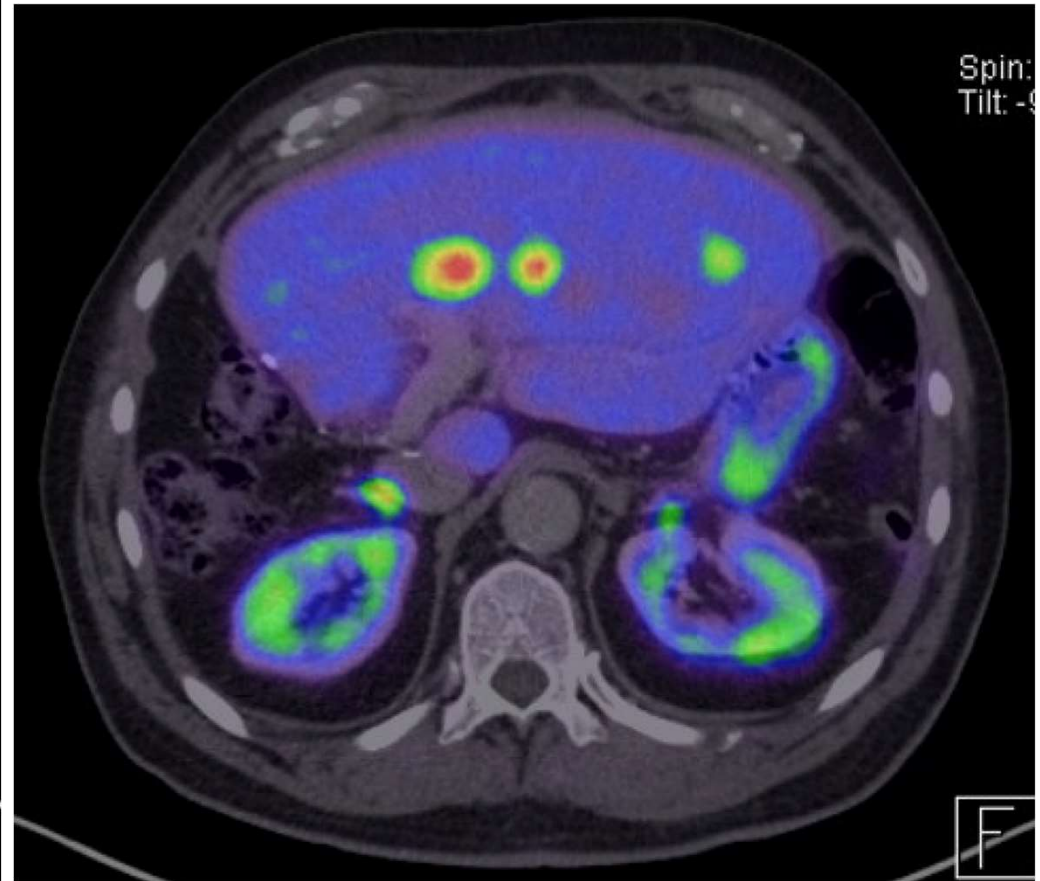
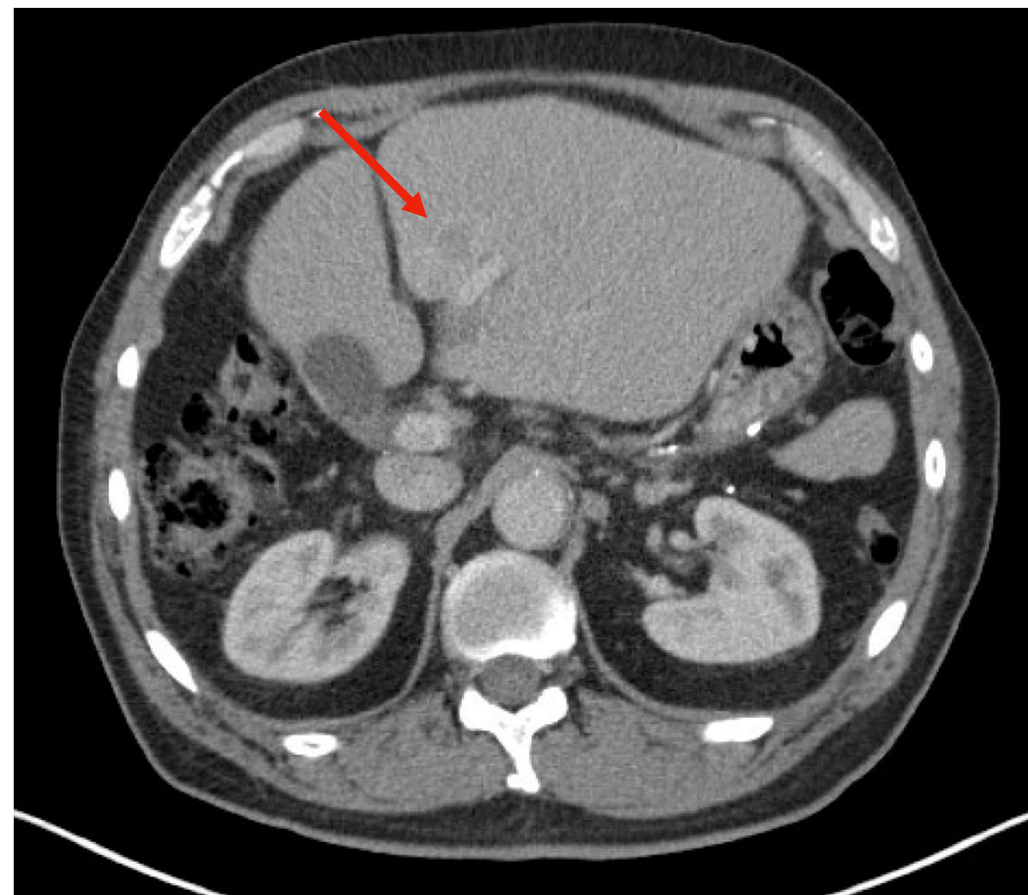
- Effective chemotherapy
- Targeted and immune therapy
- Interventional radiology techniques to increase liver remnant
- Parenchyma sparing surgery
- Combining resection with ablation
- Multistaged resection
- Laparoscopic resection
- Robotic assistance
- 3D modelling and augmented reality

Examples of Malignant Liver Tumours



Colorectal Liver Mets

Examples of Malignant Liver Tumours



Neuroendocrine Liver Met (recurrent)