Percutaneous transhepatic cholangiography (PTC) at Somerset Foundation Trust: an analysis of outcomes

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Overview of presentation

- What is percutaneous transhepatic cholangiography (PTC)?
- Outcomes in PTC nationally
- A 10-year quality improvement project in PTC outcomes at Somerset Foundation Trust

What is percutaneous transhepatic cholangiography?

- A radiological diagnostic and therapeutic procedure used to visualise, biopsy, drain and/or stent the biliary tree, primarily in the context of malignant disease.
- Indications:
  - Diagnose a cause of jaundice – visualise biliary tree, aspirate bile, take brushings
  - Decompress a dilated biliary tree, using a drain or stent, or by dilating a stricture
  - Commonly for malignant disease
  - Delineate bile leaks
  - Evaluate complications of ERCP
- It is a minimally invasive procedure – it is typically conducted when an ERCP is not possible
- Associated with high 30-day mortality and complication rate E.G. BLEEDING, BILE LEAK

National studies

Two notable multi-centre studies:

- Biliary Drainage and Stenting Registry (BDSR) audit 2009
  - 833 patients from 44 centres in the UK
  - In-hospital mortality was 19.8%, complication rate 33.9% (primarily infection, haemorrhage and pain)

- ‘The outcomes of biliary drainage by percutaneous transhepatic cholangiography for the palliation of malignant biliary obstruction in England between 2001 and 2014: a retrospective cohort study’ (BMJ Open) Rees et al.
  - 16,822 patients from all hospitals in England
  - Complication rate 20.2% within 3 months, In-hospital mortality 15.3%, 30-day mortality 23.1%

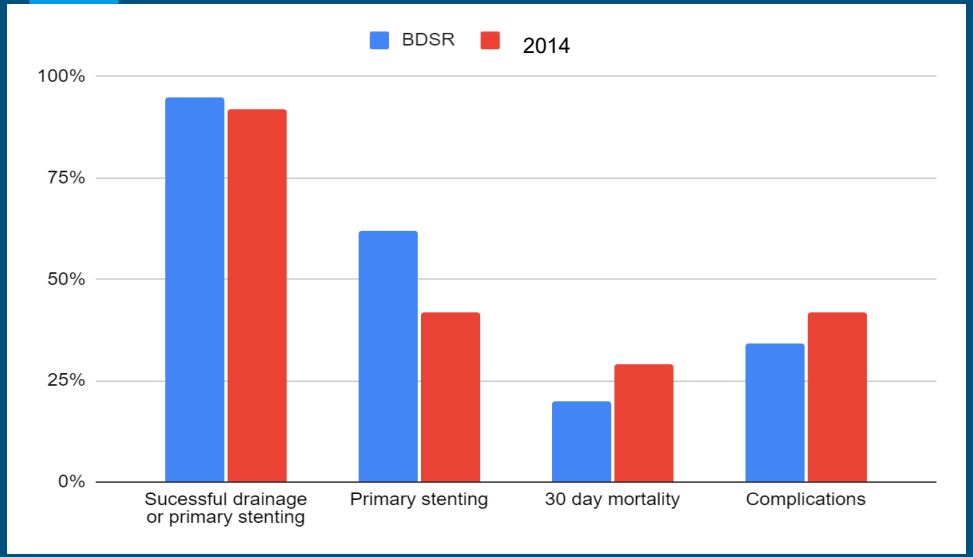
A 10-year, four cycle quality improvement project at Somerset NHS Foundation Trust:

Patients taken from the two years prior to the year below.

1) 2014
   18 patients, 22 procedures
2) 2016
   23 patients, 31 procedures
3) 2022
   25 patients, 32 procedures
4) 2024
   35 patients, 37 procedures

‘Procedures’ are defined as a cholangiogram followed by a drain or stent insertion for the purpose of achieving biliary decompression. This does not include patients returning for drain removal, stent position check or due to complications relating to an initial procedure.

Baseline data from 2014 (compared with the BDSR audit 2009):



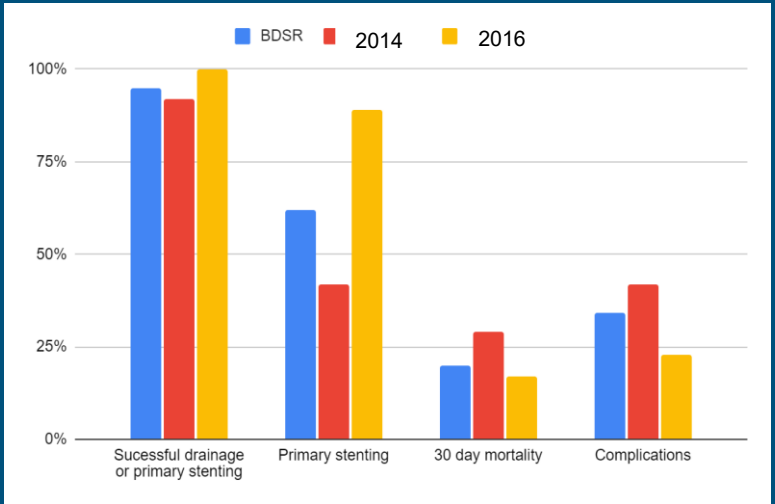
- Successful drainage during first procedure comparable with national 2009 audit, but stenting at primary procedure less than 50% at Somerset.
- 30-day mortality and complication rate higher at Somerset than in the 2009 audit.
- Due to small numbers undergoing PTC, statistical significance unable to be calculated.

Review of PTC practice at Somerset in 2014:

- Problems identified:
  - Multiple PTC referral sources
  - Little peri-procedural anaesthetic support
  - Patients managed on multiple specialty wards
  - High rate of drain migration

- Subsequent interventions:
  - All referrals made via the gastroenterology consultant team
  - 'Mini MDT' to take place prior to referrals, in order to improve patient selection. This involved gastroenterology, interventional radiology, oncology and palliative care consultants.
  - PTC not routinely done out of hours
  - Increased anaesthetic support
  - Drain locking introduced into routine practice.
  - All post-procedure care undertaken on the gastroenterology ward
  - More palliative care input for selected patients.

Repeat data collection in 2016



- Drainage at primary procedure was now 100% at Somerset Foundation Trust.
- There was a significant increase in stenting rate during the primary procedure.
- 30-day mortality now similar to 2009 national audit (20%).
- Complication rate at Somerset Foundation Trust had reduced to 20%.

Review of PTC practises at Somerset in 2016:

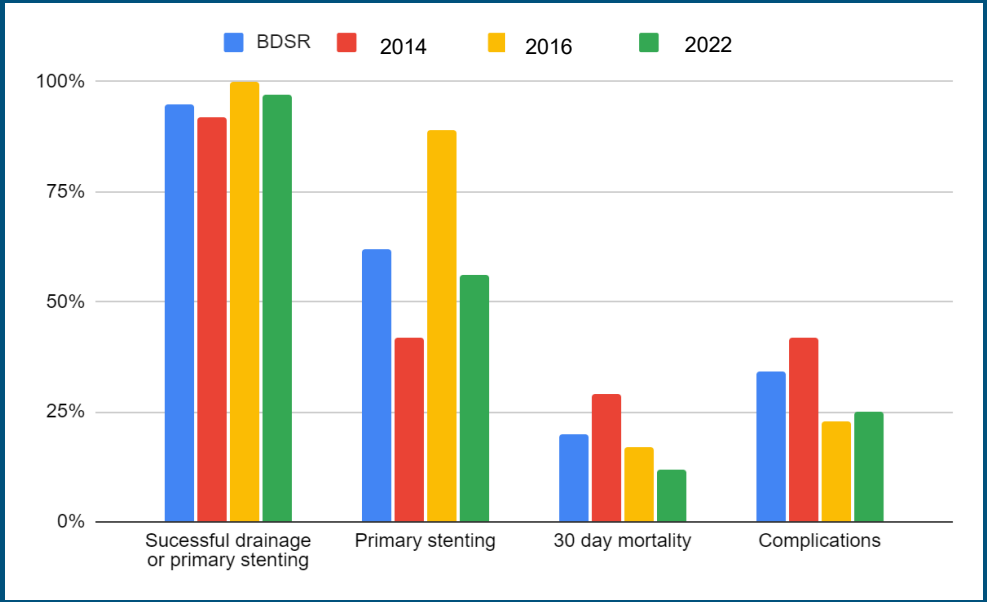
What had been improved:

- Improved patient selection, aided by ‘mini MDT’ discussion
- Drain care had improved by education and practice changes.
- Greater anaesthetic support prior to and during procedures.
- Patients placed earlier on the IR list
- Post-procedure care only on a gastroenterology specialist ward
- Nursing education in post-procedural care
- Greater palliative care input where indicated.

Subsequent interventions:

- Further focus on improving patient selection
- Improved documentation

Repeat data collection in 2022:



- Technical success was 97%. 56% were stented during their initial procedure.
- 30-day mortality 12% (15% in 2016, 28% in 2014).
- Complications affected 25% of patients: Infection 20%, AKI 12%, pain 8% and haemorrhage 4%

Following this, discussion was had about whether outcomes would improve if all patients for PTC are routinely considered for general anaesthesia.

Review of PTC practises at Somerset in 2024:

- 35 patients, 37 procedures
  - 13 female, 22 male
  - Average age 69.4 years
  - Diagnoses: 15 pancreatic cancer, 8 cholangiocarcinoma, 6 ampullary cancer, 2 duodenal cancer, 2 duodenal/ampullary cancer (unclear origin), 4 other
- 97.3% technical success rate during initial procedure
  - 62.1% were stented during their initial procedure (56% in 2022)
- 30 day mortality 16% (12% in 2022, 15% in 2016, 28% in 2014)
  - 5.4% in-hospital mortality (2 cases)
- Complications – affected 56.8% of patients
  - Infection 24.4%
  - AKI 20.0%. Pre-procedure AKI worsened in an additional 4.4%
  - Stent blockage or displacement 17.8%

Limitations of analysis over the 10-year period:

- Quality of the data collected was limited to the quality of note-keeping held on the electronic patient records system and discharge summaries (often done by non-specialist resident doctors).
- Analysis of complications limited to hospital admission – the project did not include post-discharge complications.
- Small-volume centre low-power ‘study’ - individual cases could skew the percentages.
- Comparing local and national patient outcomes can create skewed results, especially when there is significant availability in ERCP practices (and therefore which patients are referred for PTC) between different centres.

Future plans:

- Introduction of a proforma to standardise IV fluid therapy to reduce the incidence of post-PTCs AKIs.
- Further data collection to better understand whether general anaesthetic reduces the complication rate post-PTC – there is limited evidence for this at present.
- Review of pre-procedure antibiotics to reduce infection rates post-procedure.

Further national multi-centre studies are needed to better define interventions that improve outcomes and better define minimum standards in this patient population.