

## Initiative for Biliary Disease and Endoscopic Retrograde Cholangiopancreatography (ERCP) in District Hospital –Temerloh, Pahang

Dhava Mogen Raj<sup>1\*</sup>, CHE AMAN Che Jamal Abdillah<sup>1</sup>, HASSAN Azmi<sup>1</sup>

<sup>1</sup>Department of General Surgery, Hospital Sultan Haji Ahmad Shah, 28000 Temerloh, Pahang, Malaysia

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\*Corresponding author: Mogen Raj Dhava MD

Department of General Surgery, Hospital Sultan Haji Ahmad Shah, 28000 Temerloh, Pahang, Malaysia

### Abstract

### Original Research Article

Endoscopic Retrograde Cholangiopancreatography (ERCP) is a procedure that combines endoscopy and fluoroscopy primarily available in tertiary centers. Limited access in non-urban settings often results in delayed diagnosis and intervention. This study reviews the journey of ERCP service in a district hospital in Temerloh, Pahang, assessing feasibility, safety, and outcomes. ERCP service has been extended to several districts in Central Pahang including Temerloh, Maran, Bera, Bentong, Raub, Jerantut, Cameron Highland and Lipis - serving an estimated combined population of approximately 450,000 people.

**Keywords:** Cannulation, Biliary obstruction, Cholangiocarcinoma, Choledocholithiasis, ERCP.

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## INTRODUCTION

Endoscopic Retrograde Cholangiopancreatography (ERCP) is an established diagnostic and therapeutic modality for the management of biliary disease [1]. Over time, ERCP has evolved into a primarily therapeutic procedure, allowing interventions such as bile duct stone extraction, biliary sphincterotomy, and stent placement [1,4]. Early and timely ERCP has been shown to reduce morbidity and mortality, particularly in patients with condition such as choledocholithiasis, acute cholangitis, and obstructive jaundice. In addition to substantial morbidity and, if not managed promptly, may lead to severe complications including sepsis, pancreatitis, and hepatic dysfunction [2,5].

In Malaysia despite its proven benefits, the access to ERCP services remains limited in many district hospitals due to constraints in specialist expertise, infrastructure, and resource availability, often necessitating referrals to tertiary centres and resulting in delays in definitive care [3].

District hospitals play a vital role in providing accessible healthcare services to semi-urban and rural populations. The establishment of advanced endoscopic services such as ERCP at the district hospital level has the potential to improve clinical outcomes, reduce referral burden, shorten hospital stays, and optimise

healthcare resource utilization [3]. However, concerns regarding procedural safety, complication rates, and sustainability persist, particularly when ERCP is performed in a centres outside tertiary hospitals [3].

Hospital Sultan Haji Ahmad Shah, Temerloh functions as a major district referral centre for the surrounding region and manages a substantial number of patients presenting with biliary tract diseases. In response to the growing demand for timely biliary interventions, an initiative to establish ERCP services was implemented by Department of General Surgery. ERCP procedure been performing by General Surgeons.

This initiative was developed in line with the Ministry of Health (MOH) Malaysia's strategic direction to strengthen secondary-level care, improve access to essential specialist services, and reduce unnecessary referrals to tertiary centres. Enhancing service capability at the district hospital level supports equitable healthcare delivery, optimizes resource utilization, and improves continuity of care within the public healthcare system [6].

This case study aims to describe the development of the biliary disease and ERCP initiative in a district hospital setting, evaluate its feasibility and outcomes, and highlight the challenges faced.

## METHODS

A retrospective analysis of ERCP procedure performed at Hospital Sultan Haji Ahmad Shah, Temerloh by General Surgeons between January 2021 and December 2024. Data collected included indications, procedural details, therapeutic interventions, outcomes, and complications. Challenges studied are number of credentialed ERCP operators, availability and quantity of instruments.

This study was conducted as per ethical standards of the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia under registration number of RSCH ID-25-05848-E40.

Patient privacy and confidentiality were protected throughout the study through the use of anonymised data without identifiers.

## RESULTS

A total of 1096 patients underwent ERCP during the study period, mean age  $58.6 \text{ years} \pm 13.4 \text{ years}$  (range 18–85). Common bile duct cannulation success rate was achieved in 95.62% of cases. Therapeutic interventions included sphincterotomy, stone extraction, temporary biliary stenting and permanent stent placement.

Emergency cases consist 29% and Elective cases consists of 71%.

The characteristics of study population are summarised in Table 1.

PARAMETERS	PARAMETERS
Total Cases	1096
Cannulation Rate	<b>95.62%</b> ( $\approx 1,048$ successful cases)
Emergency cases	<b>29%</b> ( $\approx 318$ cases)
Elective cases	<b>71%</b> ( $\approx 778$ cases)
Complication Rate	<b>17.6%</b> ( $\approx 193$ cases)
<ul style="list-style-type: none"> <li>Post-ERCP Pancreatitis           <ul style="list-style-type: none"> <li>Bleeding</li> <li>Perforation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><b>15%</b> (<math>\approx 164</math> cases)</li> <li><b>2%</b> (<math>\approx 22</math> cases)</li> <li><b>0.63%</b> (<math>\approx 7</math> cases)</li> </ul>
<b>Age (Years)</b> <ul style="list-style-type: none"> <li>Mean</li> <li>Min</li> <li>Max</li> </ul>	$58.6 \text{ years} \pm 13.4 \text{ years}$ <ul style="list-style-type: none"> <li><b>18</b></li> <li><b>85</b></li> </ul>
<b>Gender (number, %)</b> <ul style="list-style-type: none"> <li>Male</li> <li>Female</li> </ul>	<ul style="list-style-type: none"> <li><b>455, 41.5%</b></li> <li><b>641, 58.5%</b></li> </ul>
<b>Indications (number, %)</b> <ul style="list-style-type: none"> <li>Choledocholithiasis</li> <li>Malignant biliary obstruction</li> <li>Other</li> </ul>	<ul style="list-style-type: none"> <li><b>685, 62.5%</b></li> <li><b>256, 23.4%</b></li> <li><b>155, 14.1%</b></li> </ul>

Figure 1: Characteristics of study population

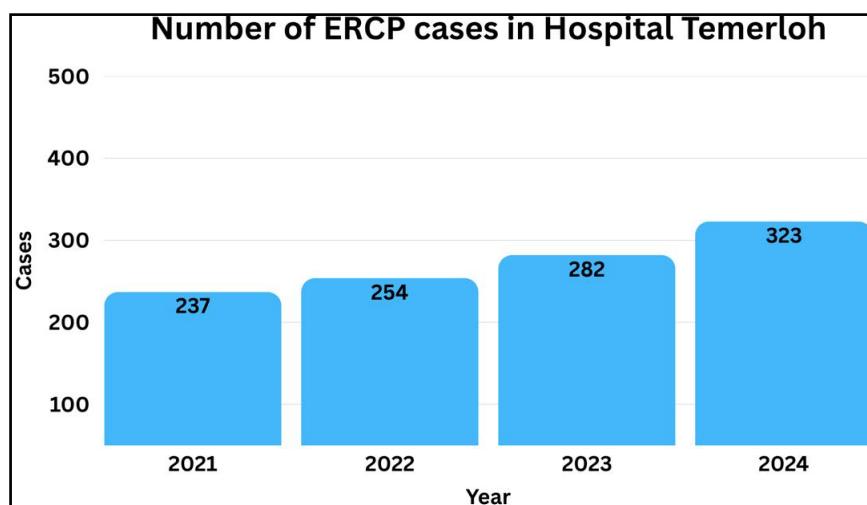


Figure 2: Number of ERCP cases performed in Hospital Temerloh

The overall complication rate was 17.6%, with post-ERCP pancreatitis (15%) being the most common, followed by bleeding (2%) and perforation (0.63%). No

mortality occurred.

Mean length of stay after ERCP: 4.2 days (range 2–14).

**Figure 3: Comparison to Standard**

	Standard	Performance
Cannulation Rate	≥ 80%	95.62%
Post ERCP Pancreatitis	≤ 5%	15%
Duodenal Perforation	≤ 0.2%	0.63%

## DISCUSSION

ERCP is a invasive procedure used for diagnostic and therapeutic. This procedure primarily used for the management of biliary and pancreatic diseases. In Malaysia, ERCP is commonly available in tertiary centres, limiting access for patients in rural and semi-urban areas. To decentralise care and improve accessibility, an initiative was undertaken to introduce ERCP services in Hospital Sultan Haji Ahmad Shah (HoSHAS), a major district hospital in Temerloh, Pahang. While the intent was to improve patient care in the East Coast region of Peninsular Malaysia, the initiative faced several key challenges and gain few outcomes.

The overall common bile duct (CBD) cannulation rate at our centre was 95.62%, which exceeds internationally accepted quality benchmarks. This rate is higher than the Joint Advisory Group on Gastrointestinal Endoscopy (JAG) recommended minimum standard of >80% for independent ERCP practice [7] and also surpasses the British Society of Gastroenterology (BSG) benchmark of ≥85% [8]. Achieving such a high cannulation rate reflects a strong level of technical expertise within the ERCP team and aligns with outcomes reported from high-performing endoscopy units, despite the challenges inherent to a district-level hospital setting.

Duodenal perforation is a rare but serious complication of ERCP, with reported incidence rates ranging from 0.1% to 0.6% in published literature [9,10]. These events are most commonly associated with endoscopic sphincterotomy, difficult cannulation, or repeated instrumentation. The American Society for Gastrointestinal Endoscopy (ASGE) has suggested an acceptable perforation rate of approximately 0.6% as a quality indicator [11].

Post-ERCP pancreatitis (PEP) remains the most common complication following ERCP. In the present study, the incidence of PEP was higher than that reported in some international series. Resource limitations at our centre necessitated the reuse of certain ERCP accessories, including guide wires, endoscopic balloons, and sphincterotomes. Reuse of these instruments may reduce their mechanical efficiency and precision, potentially increasing the likelihood of inadvertent pancreatic duct cannulation. This factor may have contributed to the higher observed rate of PEP. In

addition, a higher proportion of emergency procedures and complex biliary pathology may also have influenced the pancreatitis rate observed in this cohort.

A major challenge encountered was the limited availability of trained endoscopist, particularly hepatobiliary surgeons. In the district hospital setting, ERCP services are often delivered by general surgeons with limited prior exposure to advanced endoscopy. This necessitated structured training, mentorship, and a gradual learning curve to ensure procedural safety and efficacy.

Financial constraints further impacted service delivery, influencing the acquisition, maintenance, and replacement of endoscopic equipment and accessories. These constraints also affected patients directly, as many were unable to afford repeated referrals or treatment at tertiary care centres.

Logistical and referral-related barriers were significant, especially for patients from rural and semi-urban areas. Difficulties related to transportation, delayed referrals, and indirect costs often led to late presentation and increased disease severity at the time of intervention.

In addition, limitations in equipment and infrastructure, including restricted availability of advanced imaging and endoscopic accessories, posed operational challenges. Careful patient selection, optimised use of available resources, and adherence to standardised procedural protocols were essential to maintaining safety standards.

Despite these challenges, several favourable outcomes were observed. The establishment of ERCP services at the district hospital level resulted in improved accessibility to specialised biliary and pancreatic care, particularly for underserved populations. This reduced delays in diagnosis and intervention, especially in emergency settings.

There was significant skill development and capacity building among general surgeons, leading to progressive improvement in procedural success rates and efficiency. This demonstrates that, with appropriate training and experience, complex endoscopic procedures can be safely performed outside tertiary centres.

Clinical outcomes were encouraging, with high common bile duct cannulation rates and an acceptable complication profile. These results align with international standards, reinforcing the feasibility of delivering high-quality ERCP services in resource-limited settings.

Importantly, decentralisation of ERCP services contributed to a reduction in the burden on tertiary care centres, allowing them to focus on more complex cases. This also translated into lower overall healthcare costs for patients, by minimising travel, accommodation expenses, and loss of wages.



Figure 4: Sample image of Cholangiogram

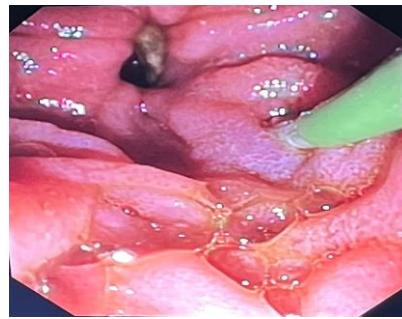


Figure 5: Endoscopic image of cannulation

## CONCLUSION

The introduction of ERCP service in a district hospital in Temerloh demonstrated high volume of performance and success rates with acceptable complication profiles. This initiative improved patient outcomes with access to timely intervention.

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**Conflict of Interest:** The authors declare no conflict of interest.

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