

Does the presence of a trainee compromise success of biliary cannulation at ERCP?



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ABSTRACT

Background and study aims Findings in the literature are conflicting on whether trainee involvement in endoscopic retrograde cholangiopancreatography (ERCP) procedures is detrimental to cannulation success rates. We addressed this in a prospective study, where cannulation success with or without trainee presence was the primary outcome measure.

Patients and methods We prospectively recorded data on 2 senior endoscopists and their trainees over an 18-month period for ERCPs in patients with a virgin ampulla. Presence or absence of a trainee at ERCP procedures was pragmatic, reflecting their other service or training commitments or annual leave. For trainee presence, the training protocol allowed them 6 minutes of supervised time in which to achieve biliary cannulation after reaching the ampulla. Study outcome measures included cannulation success, time to cannulation, technique, whether this was achieved independently by the trainee, and complications. **Results** There were 219 procedures recorded and analyzed (134 with a trainee, 85 without). Three trainees were involved. Selective biliary cannulation was achieved in 201 (92%) of cases. When a trainee was present, cannulation was successful in 122/134 procedures (91%), compared to 79/85 (93%) with a senior endoscopist alone ($P=0.8$, Fisher's exact test). Mean time to biliary cannulation with a trainee present was 7 minutes, compared with 5 minutes with no trainee. Mean time for successful independent cannulation by the trainee was 4 minutes, and 9 minutes for a consultant following a trainee's attempt. There were no serious adverse events.

Conclusion Our study shows that with this training protocol, involvement of a trainee on a routine secondary care ERCP list does not impair biliary cannulation success, and does not prolong a subsequent attempt by the senior endoscopist if initially unsuccessful. These findings support the involvement of trainees in routine ERCP lists with this training protocol.

Introduction

ERCP has evolved from that of a diagnostic procedure in which its role has largely been replaced by noninvasive imaging, to an interventional procedure, whose role is as important as ever in the face of an aging population with its high incidence of pancreaticobiliary pathology. For the senior endoscopist there are at least 3 challenges that characterize each case: patient tolerance, procedural success, and post-procedure complications. Together with these challenges there is a need to train the next generation of endoscopists, and balancing these challenges

with the quality standards expected of a modern ERCP service is difficult [1]. There is evidence from several case series that involvement of trainees may compromise cannulation success rates [2–5]. There is also possible concern that involvement of a trainee may make subsequent cannulation more difficult for the senior endoscopist, thereby increasing risk of complications such as pancreatitis [6, 7]. These concerns may dissuade some practitioners from offering training other than to highly motivated and capable trainees [8]. However, in contrast, other case series have not found such a detrimental effect of trainee involvement in ERCP cases [3, 7, 9, 10]. None of the

published case series addressed trainee involvement and cannulation success rate as a primary outcome measure, so we addressed this in a prospective case series in a secondary care setting in the UK. The aim of the study was to address whether involvement of a trainee in ERCP cases with a virgin ampulla has a detrimental effect on biliary cannulation success rates, compared with a senior endoscopist doing the procedure alone.

Patients and methods

The setting was a secondary care ERCP service in an acute district general hospital with an annual caseload of approximately 330 ERCP cases per year. The service is led by 2 senior endoscopists, each with over 5 years' experience in providing ERCP training to specialist registrars within the deanery. Specialist registrars with an interest in ERCP are given basic training in ERCP subject to completion of accreditation in upper gastrointestinal endoscopy. Procedures are done with conscious sedation. The trainee is allowed to start the procedure and once the ampulla has been reached (with or without assistance) and a stable position achieved, the trainee is allowed 6 minutes within which to achieve cannulation of the selected duct under supervision. If cannulation is achieved the trainee continues with the procedure if the trainer feels it appropriate to do so. If not then the trainer takes over. Cases are routinely done with a short-wire system (Cook UK), using a wire-led or cannula-led approach to the ampulla according to Ampullary morphology and the trainer's judgement. Secondary techniques are used at the discretion of the trainer. Successful cannulation is defined as deep cannulation of the desired duct with the guidewire and cannula.

For this study, procedural details were recorded on a proforma (► Fig. 1). Presence or absence of a trainee was not randomized but was pragmatic; the Trust has 2 specialist registrars (usually allocated because of an interest in learning ERCP) but trainee presence on ERCP lists is inconsistent because of other priorities (acute general medical rota, mandatory regional training days, annual and study leave etc). Therefore the study reflected normal working practice. The primary outcome measure was success of biliary cannulation; secondary outcomes included time to cannulation, technique of cannulation, whether independent cannulation achieved by the trainee, and whether there were any immediate significant complications.

Results

Over an 18-month period from September 2013 to March 2015 we collected data from 219 ERCP procedures with a virgin ampulla. Among these cases a trainee was present for 134 (61%) and absent for 85 (39%). Procedural indications reflected the normal working practice of a district general hospital; pre-procedure imaging suggested gallstone disease in 67%, biliary stricture in 7% and uncertain or other pathology in 26%. Procedures requiring selective cannulation of the pancreatic duct were excluded from the study. Predicted grade of difficulty varied with 133 patients classified as grade 1 (61%); 81 patients as grade 2 (37%); and 3 patients as grade 3 (2%) using the Cot-

ERCP Cannulation Rate Study Date _____

Patient Name: _____

Indication for ERCP _____

Cotton Grade of Difficulty _____

Type of Ampulla: _____

Trainee present: Y N initials _____

Successful Cannulation: Y N

Technique: Wire-led Hydrophilic wire
 Cannula-led Wire then loop-tip
 Other Loop-tip only

Procedure done by: Trainee
 Trainee then consultant
 Consultant only

Time to Cannulation _____

Local/Immediate complications Y N (specify) _____

Prophylactic PD stent: Y N

Comments on case _____

► Fig. 1 Study proforma.

ton scale [11]. Three trainees were included in the data capture, all of whom had performed <50 ERCP procedures each prior to starting training at this center. For a summary of results please refer to ► Table 1.

Primary outcome

Cannulation rates

Selective cannulation was achieved in 201 (92%) of the 219 procedures. When a trainee was present, cannulation was successful in 122/134 procedures (91%); when there was no trainee present, cannulation was successful in 79/85 (93%) ($P=0.8$, Fisher's exact test).

For the 2 individual consultants, successful cannulation rates with a trainee were 92% and 90% respectively, and without a trainee were 93% and 93% respectively ($P=1$ for both, Fisher's exact test).

Secondary outcomes

Time to cannulation

Mean time to biliary cannulation with a trainee present was 7 minutes, compared with 5 minutes with no trainee ($P<0.01$, Student's t-test). Mean time for successful independent cannulation by the trainee was 4 minutes, and 9 minutes for a consultant following a trainee's attempt. Therefore when a consultant took over from a trainee after the allotted 6 minutes, a further 3 minutes were required on average for successful cannulation, i.e. a shorter cannulation time compared with a consultant-only procedure.

► **Table 1** Summary of results.

Number of procedures	219			
Trainee present	61 %			
Cotton grade of difficulty	1	61 %		
	2	37 %		
	3	2 %		
Primary outcomes				
Successful biliary cannulation	Overall	92 %		
	Trainee present	91 %	<i>P</i> = 0.8	
	Trainee absent	93 %		
Secondary Outcomes				
Mean time to cannulation	Trainee Present	Independent	4 min	
		Trainee then consultant	9 min	
		Overall	7 min	
	Trainee Absent	5 min		
Techniques	Wire-led	Trainee	46 %	
		Consultant	61 %	
		Overall	54 %	
	Cannula-led	Trainee	50 %	
		Consultant	36 %	
		Overall	41 %	
	Unspecified (overall)		5 %	
Complications	Minor ampullary bleeding		2 cases	
	False guidewire passage		2 cases	
	Prophylactic stents	Overall	21 cases	
		Trainee present	12 cases	<i>P</i> = 0.8
		Trainee absent	9 cases	

Cannulation technique

Fifty-four percent of successful procedures were wire-led and 41 % were cannula-led (5 % unspecified). For trainee success, 46 % of successful procedures were wire-led and 50 % were cannula-led (4 % unspecified). Secondary techniques to achieve CBD cannulation were used in 14/219 (6 %) of the cases, and were successful in 11/14 (80 %). The secondary techniques used were locked pancreatic duct wire cannulation (10 cases), pre-cut sphincterotomy (3 cases), and needle-knife fistulotomy (2 cases). In the 10 cases where a locked pancreatic duct wire cannulation was required, 8 (80 %) were with a trainee present, and 2 (20 %) without. Prophylactic pancreatic duct stents were placed in 21/219 cases (10 %); 12 in cases with the trainee present, 9 in cases without (*P* = 0.8).

Trainee success rate

Overall trainee success rate for independent cannulation was 34 % with no major immediate complications recorded. For the

3 individual trainees, successful cannulation rates were 46 %, 43 %, and 11 %.

Complications

There were no significant immediate complications. Ampullary bleeding and false guidewire passage were recorded in 2 cases each; none required any further intervention after the procedure. This study was not designed to monitor prospectively for later complications but within the study period there were no cases of complicated pancreatitis (i.e. requiring further intervention); no cases of procedure-related perforation, and no procedure-attributed deaths.

Discussion

Our study shows that having a trainee present on a routine secondary care ERCP list does not impair biliary cannulation. Overall, successful cannulation was achieved in 91 % of cases with a

trainee present in this series. This exceeds the threshold of 85 % set out in the 2014 BSG standards framework for ERCP and earlier published case series from the UK [1, 12]. High success rates were observed for both trainers working with trainees. In addition (within the constraints of this study) a failed attempt by the trainee on average did not then prolong the consultant's time on the ampulla, despite all trainees being junior (<50 procedures prior to this placement and independent trainee cannulation success rate of only 34% within this study period). While having a trainee present may prolong the total length of time it takes to achieve biliary cannulation, this did not appear to lead to increased rates of immediate post-procedural complications or need for prophylactic pancreatic duct stenting. Although we found a slightly higher likelihood of needing a secondary cannulation technique with a trainee present, the number of cases was still relatively small and accounted for only 5% of procedures.

Our data are encouraging for trainees but other published case series remain conflicting. The reasons for conflicting outcomes from other case series may reflect the retrospective nature of many series and a lack of standardisation for trainee involvement. Variables that may impact on success or failure of cannulation where a trainee is involved may include the use of propofol or other general anaesthetic agents, caseload and case mix (including whether the ampulla is "virgin" or not), use of short-wire vs. long-wire techniques, the skills and prior experience of both the trainee and trainer, and the time allowed for the trainee [13, 14]. Most of these variables remain unexplored but they may help explain differences in trainee-related outcomes in other case series. A further prospective study, with a larger cohort of patients, trainees and consultants might help to clarify the variation observed amongst such studies.

Some case series have suggested a threshold of around 200 ERCPs for competence to perform ERCPs independently, and the low trainee success rate for independent cannulation in our study (with trainees being at an early stage of training) accords with this [13, 15, 16]. This low success rate is commensurate with a previous audit from the UK [2]. The success rate may have been improved by allowing the trainee more time at the ampulla; one recent prospective study identified an allowance of 10 minutes as the optimum trainee time [14]. Our protocol of allowing 6 minutes is not evidence-based but has evolved as a pragmatic approach allowing for other factors including patient tolerance, ampullary "compliance", hyoscine half-life, and list caseload. A longer trainee time, while desirable for trainee outcomes, may depend on provision of deeper levels of anaesthesia and support being available.

Conclusion

Our pragmatic ERCP training protocol is likely to be reflective of other ERCP training in the UK [2, 17]. There may be more effective ways to deliver training in terms of achieving better trainee success rates, but we hope that our findings will reassure experienced endoscopy trainers that ERCP training can be delivered via the protocol we have described without compromising their own cannulation success rates.

Competing interests

None

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