

Rendezvous procedure, a simultaneous endoscopic retrograde cholangiopancreatography and laparoscopic cholecystectomy for choledocholithiasis, in a rural surgical program in Northwest Ontario

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Abstract

Introduction: Northwest Ontario has a high prevalence of cholelithiasis, at 1.6 times the provincial norm. There is a concomitant 14% rate of choledocholithiasis. Accessing surgical services in the region often requires extensive travel by air. Choledocholithiasis management is typically with a 2-staged approach, an endoscopic retrograde cholangiopancreatography (ERCP) followed several days or weeks later by laparoscopic cholecystectomy (LC). Regional surgeons were concerned about the patient burden of travel and the loss to follow-up inherent in scheduling two independent procedures at separate hospital admissions. They adopted a 1-stage management, called the rendezvous procedure, which describes the simultaneous performance of an ERCP and LC.

Methods: We accessed Sioux Lookout Meno Ya Win Health Centre hospital data for all patients receiving an ERCP and LC between 1 June 2019 and 1 December 2022. We documented patient demographics, operative outcomes, length of stay and transfer to other facilities.

Results: There were 29 rendezvous procedures performed, with successful cannulation of the ampulla of Vater in 27 (93%) cases and stone removal in 23 (79%), with a complication rate of 7%. The operating time averaged 136 min, and two patients required transfer to a tertiary care centre and four were stented locally and required a return trip to Sioux Lookout for repeat ERCP and successful stone removal. The average length of stay was 2.1 ± 1.3 days. Patients who could not access a rendezvous procedure averaged 46.1 ± 78.1 days between procedures.

Conclusion: Managing choledocholithiasis with a 1-stage approach was safe and effective and reduced patient travel, time to definitive care and hospital admissions.

Keywords: Gall bladder disease, rural, surgery

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Résumé

Introduction: Le nord-ouest de l'Ontario présente une prévalence élevée de cholélithiase, soit 1,6 fois la norme provinciale. Le taux de cholédocholithiase concomitant est de 14%. L'accès aux services chirurgicaux de la région nécessite souvent de longs déplacements en avion. La prise en charge de la cholédocholithiase SE fait généralement en deux étapes: Une cholangiopancréatographie rétrograde endoscopique (CPRE) suivie, plusieurs jours ou semaines plus tard, d'une cholécystectomie laparoscopique (CL). Les chirurgiens régionaux étaient préoccupés par le fardeau que représentaient pour le patient les déplacements et la perte de suivi inhérents à la programmation de deux procédures indépendantes à des admissions hospitalières distinctes. Ils ont adopté une gestion en une étape appelée procédure de rendez-vous, qui décrit la réalisation simultanée d'une CPRE et d'une CL.

Méthodes: Nous avons accédé aux données hospitalières du centre de santé Meno Ya Win de Sioux Lookout pour tous les patients ayant bénéficié d'une CPRE et d'une CL entre le 1^{er} juin 2019 et le 1^{er} décembre 2022. Nous avons documenté les données démographiques des patients, les résultats opératoires, la durée du séjour et le transfert vers d'autres établissements.

Résultats: Vingt-neuf procédures de rendez-vous ont été réalisées, avec une canulation réussie de l'ampoule de Vater dans 27 cas (93%) et l'ablation des calculs dans 23 cas (79%), avec un taux de complication de 7%. Le temps d'opération a été en moyenne de 136 min. Two patients ont dû être transférés dans un centre de soins tertiaires et 4 ont été stentés localement et ont dû être ramenés à Sioux Lookout pour une nouvelle CPRE et une extraction réussie du calcul. La durée moyenne du séjour était de $2,1 \pm 1,3$ jours. Les patients qui n'ont pas pu accéder à une procédure de rendez-vous ont passé en moyenne $46,1 \pm 78,1$ jours entre les procédures.

Conclusion: La prise en charge de la cholédocholithiase en une seule étape s'est avérée sûre et efficace et a permis de réduire les déplacements des patients, les délais de prise en charge définitive et les admissions à l'hôpital.

Mots-clés: Rural, chirurgie, maladie de la vésicule biliaire

INTRODUCTION

Gall bladder disease is common in Northwest Ontario, with a prevalence of cholecystitis 1.6 times the provincial norm and an accompanying 14% rate of choledocholithiasis.¹ While cholecystitis without evidence of an impacted common bile duct (CBD) stone is managed with a standard laparoscopic cholecystectomy (LC), management for suspected or confirmed choledocholithiasis is typically managed in two stages. An initial endoscopic retrograde cholangiopancreatography (ERCP) provides stone removal and symptom relief, followed days or weeks later by an LC for the removal of existing and prevention of future calculi.^{2,3}

Choledocholithiasis managed in a 1-stage procedure, called a 'rendezvous', combines a simultaneous ERCP and LC.⁴ First described in Montreal in 1993, the 'rendezvous' of the two procedures occurs when a guidewire introduced by the LC surgeon through the cystic and CBD is used by the ERCP endoscopist to facilitate the cannulation of the sphincter of Oddi for stone removal.⁵ Patients undergo a single anaesthetic and hospital stay. This is particularly advantageous

in Northwest Ontario, where the patients require travel by air for surgical services.^{1,6} The rendezvous procedure was introduced at the Sioux Lookout Meno Ya Win Health Centre (SLMHC) in 2019 to address two local surgical concerns: reduction of patient travel and limiting the possibility of patients being lost to follow-up.

This retrospective study describes the outcomes of the introduction of this 1-stage approach to the management of choledocholithiasis in a rural hospital in Northwest Ontario.

METHODS

SLMHC provides surgical services to a catchment population of 30,000, across a geographic area of 385,000 km². Most patients (25,000) from 26 remote First Nations communities lack road access and travel by air for elective and emergency surgical services, provided by a staff of three general surgeons.⁶ The distance between transferring hospitals is approximately 400 km, and some communities are 700 km distant.

Data for all patients receiving a simultaneous ERCP and an LC, from 1 June 2019 to

1 December 2022, were accessed through hospital medical records. Patients were identified by surgical schedules and cross-referenced to hospital administrative coding. Reliability was verified by the manual review of surgical notes (JP). Data included patient demographics and comorbidity at the initial presentation. Operative outcomes were the rate of successful CBD cannulation, stone removal and complications: pancreatitis, bleeding, perforation and sepsis. The total operating time was measured by 'cut-to-close' time. Resource intensity was measured by the duration of the procedure, hospital length of stay and number of patient transfers.

The study was approved by the Sioux Lookout Meno Ya Win Health Centre Research Review and Ethics Committee (#02-21).

RESULTS

During the 30-month study, 29 patients received a rendezvous procedure. Table 1 indicates patient demographics, and Table 2 shows the outcomes for the rendezvous procedure.

There were six failed stone removals; two patients were transferred to tertiary care centres and four were stented at SLMHC with successful stone removal at a subsequent local repeat ERCP.

During the study, 13 patients could not be managed with a rendezvous procedure due to the unavailability of a second surgeon; they required separate procedures. The average time between procedures was 46.1 ± 78.1 days, during which they averaged 1.3 ± 1.6 gall bladder-related emergency department visits, which often involved a medical transfer from their remote community.

SLMHC does not have intensive care unit facilities; hence, patients presenting with a high anaesthesia risk or multiple comorbidities, or those with a body mass index >50 , are transferred to tertiary care centres.

DISCUSSION

A 2011 study in Northwest Ontario documenting a high rate of regional gall bladder disease identified the need for a Sioux Lookout-based ERCP service.¹ In 2019, a general surgeon with ERCP training joined the surgical staff and an ERCP program was initiated, followed by the introduction of the rendezvous procedure

Table 1: Patient demographics for patients undergoing a rendezvous procedure (n=29)

Age (years)	37.9±19.2
Female sex, n (%)	20 (69)
BMI (km/m ²)	29.8±6.2
Diabetes mellitus, n (%)	4 (14)
Hypertension, n (%)	7 (24)
Hypercholesterolemia, n (%)	1 (3)
Coronary artery disease, n (%)	2 (7)
Smoker, n (%)	11 (38)
Alcohol use, n (%)	4 (14)
Opioid use, n (%)	9 (31)

BMI: Body mass index

Table 2: Rendezvous procedure outcomes (n=29)

Successful CBD cannulation, n (%)	27 (93)
Stone removal, n (%)	23/29 (79)
Total surgery time (min), mean±SD	136±49.6
Length of hospital stay (days), mean±SD	2.1±1.3
Post-operative pancreatitis, n (%)	1 (3)
Perforation, n (%)	0
Bile leak, n (%)	1 (3)
Sepsis, n (%)	0
Total complications, n (%)	2 (7)
Transfers to tertiary care centre, n (%)	2 (7)

CBD: Common bile duct, SD: Standard deviation

for the management of suspected or confirmed choledocholithiasis. Patients with cholecystitis and no evidence of CBD stone continue to receive traditional LC surgery.

Patient characteristics

Our small sample was predominantly female (69%), compared to a provincial rate of 59% of cholecystitis patients, but consistent with previous high regional estimates of female gall bladder disease.^{1,7} The mean age of 37.9 years is younger than the provincial mean of 56 years and is consistent with a younger mean age found in other First Nations populations of Northern Ontario, Manitoba and Quebec.^{1,7-9}

Program outcomes/complications

Successful CBD cannulation was achieved in 93% of the 29 cases and stone removal in 79%. These compare to the recommended rates of 80% and 85%, respectively. The complication rate of 7% was within the accepted procedure-related rate of $<10\%$.³

Our results are consistent with larger studies and meta-analyses documenting the safety and efficacy of the rendezvous procedure. A 2020 systematic review ($n = 10,611$) comparing the 1-stage to the traditional 2-stage management found the equivalent rates of stone clearance (odds ratio [OR] 2.20, $P = 0.10$), but less post-operative pancreatitis (OR 0.26, $P = 0.0003$) and overall lower morbidity (OR 0.41, $P < 0.0001$).¹⁰ A large meta-analysis of 20 studies ($n = 2489$) compared the efficacy and safety of four combinations of laparoscopic and intraoperative techniques and found that the rendezvous procedure had the highest success rate and lowest morbidity compared to either an LC with a pre- or post-ERCP or laparoscopic CBD exploration techniques.¹¹

Operating times

Our operating time of 136 min was similar to larger urban studies. A 2020 prospective study ($n = 528$) found a median operation time of 139.8 min, and a meta-analysis of eight rendezvous studies documented a range of operating times of 127–217 min.^{10,12}

Technical considerations, such as the introduction and manipulation of the guide wire, contribute to longer total operating times for 1-stage management. A 2018 Cochrane review ($n = 531$) found that the rendezvous management incurred a mean of an additional 34 min to the total operating time compared to two independent procedures.¹³

Time to definitive care

Two-stage management results in time between procedures; in many rural settings, this is an opportunity for patients to become lost to follow-up and develop recurrent cholecystitis. During our study, the 13 patients who required two procedures had an average of 46 days between admissions. The time to definitive treatment (i.e., LC) in a 2020 European study ($n = 357$) for patients receiving 2-stage management was 40.3 ± 127 days.¹⁴ Patients receiving their LC beyond the recommended interval of several days identify the challenge in having patients return for a second procedure.^{2,3}

Medical transfers

Before ERCP was introduced at SLMHC, a 2011 analysis of patients requiring an ERCP, and subsequent LC described the travel requirements of 17 patients who had an average of 6.5 medical transfers.¹ Since adopting the rendezvous procedure, patient travel has been reduced to one round-trip to Sioux Lookout, with the exception of the six patients with unsuccessful stone removal; two of whom were transferred to a larger centre and four who returned to SLMHC for a subsequent ERCP. Reduced travel not only simplified the travel burden of patients but also reduced the substantial physician workload of arranging medical transfers and returns between facilities and northern communities.

Resources

Traditionally, ERCPs were performed by gastroenterologists, and the patient would be rescheduled for an LC by a surgeon several days or weeks later. As ERCP skills become more common in general surgery training, unifying the procedures becomes logistically possible.

Required hospital resources include program capacity for ERCP and LC, a side-viewing endoscope and operating room fluoroscopy for intraoperative cholangiograms. Two physicians with speciality skills must be present for simultaneous ERCP endoscopy and LC. One advantage is the increase in local surgical ERCP expertise as shoulder-to-shoulder peer training occurs.

These requirements may pose a significant challenge for many rural hospitals; however, those with the resources may consider adopting the rendezvous procedure if it is a good fit for their surgical program and patient population. While we describe the program in a rural hospital, rural patients travelling to urban centres would also benefit from 1-stage management of choledocholithiasis.

Limitation

The primary limitation of the study is the small number of procedures. Operation duration times in the literature were heterogeneous; some authors used anaesthesia time rather than

'cut-to-close' operating time; hence, a comparison of the absolute times involved is less informative than the overall trend.

CONCLUSION

Adopting a single 'rendezvous procedure' for the management of choledocholithiasis has important implications for improving patient care and optimizing healthcare resources. This is particularly relevant for rural patients who experience onerous travel requirements when accessing surgical services.

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