

Outcomes of endoscopic ultrasound-guided gallbladder drainage in malignant biliary obstruction: A meta-analysis Ahmed M. Abdelfattah, MD¹; Karim T. Osman, MD², Dhruval Amin, MD³; Sumayya Akhtar, BS¹; Prashanth Rau, MD¹; Neil Marya, MD¹ Department of Gastroenterology, UMass Memorial Health² Department of Internal Medicine, Lahey Clinic ³ Department of Internal Medicine,

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Introduction

Endoscopic ultrasound-guided gallbladder drainage (EUS-GBD) described as an alternative palliative treatment for malignant biliar (MBO). We aim to assess the outcomes of EUS-GBD for MBO.

Methods

- We conducted a comprehensive literature review of MEDLIN Cochrane, and Scopus databases
- Population of interest: Patients with MBO who underwent EUS-GBD
- Outcomes of interest: technical success, clinical success, adverse reintervention rates.
- Pooled estimates were calculated following the restricted maxim method using random effects model.

Definitions

- Technical success: successful stent deployment
- Clinical success: resolution of the indication to proceed with EUS-G includes improvement of jaundice or significant improvement of bilir
- Reintervention: defined as the need for reintervention after achievin SUCCESS
- Immediate adverse events: complications that occurred intra-proced first 24 hours after the procedure
- Delayed adverse events: complications that occurred after the first doing the EUS-GBD drainage

Results

- **Table 1** summarizes the study characteristics
- The pooled technical success rate was 91.66% (95% CI 83.13-96.0)
- The pooled clinical success rate was 82.32% (95% CI 74.90-87.89%)
- Three patients had immediate adverse events. None of the studies the immediate adverse events were. The pooled immediate adverse were 8.45% (95% CI 4.38-15.68%; I²=0)
- Thirteen patients had delayed adverse events. The delayed ad reported were food impaction in the stent (n=3), stent migration &/ (n=3), bleeding (n=2), cholangitis (n=1), peritonitis (n=1), and unk events (n=3). There were no deaths related to the procedure delayed adverse events rates were 13.81% (95% CI 8.45-21.76%;
- Nine patients required reintervention to address some of the del events (n=5), and for unclear reasons (n=4). The pooled reinte were 15.71% (95% CI 9.20-25.51%, I2=0)

) has been	Table 1. Study characteristics										
ary obstruction	Study (year); Location	Sample size (n)	Age (years)	Sex	Type of malignancy	Site of stent	Follow-up period (months)				
	Rai (2014); India	1	30	Μ	Ampullary cancer	Stomach	1				
NE, EMBASE,	Itoi (2013); United States of America	1	57	Μ	Head of the pancreas malignancy	Stomach	12				
) se events and	Chin (2020); New Zealand	4	-	-	-	_	-				
num likelihood	Pleasant (2020); United States of America	1	88	Μ	Ampullary cancer	_	0.25				
	Flor de Lima (2021); Portugal	1	60	F	Cholangiocarcinoma	Stomach	2				
BD which rubin	Paleti (2019); United States of America	7	67 ± 13.3	5M, 2F	Head of the pancreas malignancy	_	-				
dural till the	Issa (2021); United States of America	28	68 ± 13	16M, 12F	NR	Duodenum (n=15), Stomach (n=13)	33 (range 3-64)				
24 hours of	Cecinato (2017); Italy	1	81	Μ	Head of the pancreas malignancy	Jejunal roux limb	-				
	Lambin (2017); France	28	-	-	Pancreatic cancer (n=19), cholangiocarcinoma (n=4), other malignancies (n=5)	-	3.6 ± 5				
	Suzuki (2018); Japan	1	70	F	Pancreatic cancer	Duodenum	17				
)8%, l²=0) %, l²=0)	Ligresti (2019); Italy	1	70	F	Adenocarcinoma involving distal CBD and duodenum	Stomach	-				
s reported what se events rates	Binda (2021); Italy	48	74.3 ± 11.7	23M, 25F	Pancreatic cancer (n=40), cholangiocarcinoma (n=2), duodenal and ampullary cancers (n=2); other malignancies (n=4)	Duodenum (n=20), Stomach (n=28)	4.07 ± 5.37				
dverse events /or dysfunction known adverse e. The pooled 12 =0)	lmai (2016); Japan	12	67.3 ± 13.9	8M, 4F	Pancreatic cancer (n=6), lymph node metastasis (n=3), cholangiocarcinoma (n=2), lymphoma (n=1)	Duodenum (n=5), Stomach (n=7)	-				
elayed adverse ervention rates	Chang (2019); USA	9	63.1 (mean)	5M, 4F	Pancreatic cancer	Duodenum (n=5), Stomach (n=4)	4.36				

Results

Figure 1. Pooled outcomes

Technical Success

Study	Event Rate	95% C.I.	Events p observa
Rai 2014	100.00	[10.89; 98.66]	<
Itoi 2013	100.00	[10.89; 98.66]	<
Chin 2020	100.00	[32.64; 99.41]	<
Pleasant 2020	100.00	[10.89; 98.66]	<
Flor de Lima 2021	100.00	[10.89; 98.66]	*
Paleti 2019	100.00	[46.14; 99.62]	<
Issa 2021	100.00	[77.68; 99.89]	
Cecinato 2017	100.00	[10.89; 98.66]	<
Lambin 2021	100.00	[77.68; 99.89]	
Suzuki 2018	100.00	[10.89; 98.66]	<
Ligresti 2019	100.00	[10.89; 98.66]	<
Binda 2021	100.00	[85.68; 99.94]	
Imai 2016	100.00	[59.68; 99.76]	< <u> </u>
Chang 2019	100.00	[52.51; 99.69]	<
Random effects mod	lel 91.66	[83.13; 96.08]	

C. Reintervention rates

Study	Event Rate	95% C.I		Ever	nts per ervatio	100 ns	
Rai 2014	0.00	[1.34; 89.11]	ı—			→
Itoi 2013	0.00	[1.34; 89.11	1	ı			\rightarrow
Flor de Lima 2021	0.00	[1.34; 89.11	1	ı —			→
Issa 2021	17.86	[7.63; 36.38	1		-	1	\rightarrow
Lambin 2021	14.29	[5.47; 32.45]	,			\rightarrow
Suzuki 2018	0.00	[1.34; 89.11]	ı —		<u> </u>	\rightarrow
Ligresti 2019	0.00	[1.34; 89.11]	ı—		<u> </u>	\rightarrow
Imai 2016	0.00	[0.24; 40.32]	-		<u> </u>	\rightarrow
Chang 2019	0.00	[0.31; 47.49]	-			\rightarrow
Random effects model	15.71	[9.20; 25.51]	<mark>ן ר</mark>	1	<		-
			-10	0	10	20	30

- interventions







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Rai 2014 Itoi 2013 Pleasant 2020 Flor de Lima 202 Paleti 2019 Issa 2021 Cecinato 20 Lambin 202 Suzuki 2018 Ligresti 201 Binda 2021 Imai 2016

Clinical Success



E. Delayed adverse events

Study	Event Rate	95% C.I.		1	obs	ts pe ervat	r 100 ions		
Rai 2014	0.00	[1 34 80 11]	. –		<u> </u>				→
toi 2013	0.00	[1.34, 03.11]			1				
Pleasant 2020	0.00	[1.34, 89,11]	x -		1				
Flor de Lima 2021	0.00	[1.34, 89 11]			1				<i>→</i>
Paleti 2019	0.00	[0.38:53.86]	I		<u> </u>				→
ssa 2021	0.00	[0.11; 22.32]	-		-				
Cecinato 2017	0.00	[1.34; 89.11]	ж —		-				\rightarrow
Lambin 2021	0.00	[0.11; 22.32]	×		+		-		
Suzuki 2018	0.00	[1.34; 89.11]	n —		-				\rightarrow
Ligresti 2019	0.00	[1.34; 89.11]	× -		+				→
Binda 2021	6.25	[2.03; 17.66]		-1			-		
mai 2016	0.00	[0.24; 40.32]	<u>e</u>		+				\rightarrow
Chang 2019	0.00	[0.31; 47.49]			-				\rightarrow
Random effects model	8.45	[4.38; 15.68]	_	-	-	=	-	-	_
		(0	5	10	15	20	25	30

D. Immediate adverse events

Study	Event Rate	95% C.I.	Eve	ents per servatio	100 ons	
Rai 2014	0.00	[1.34; 89.11]	ı—			→
Itoi 2013	0.00	[1.34; 89.11]	ı —			\rightarrow
Chin 2020	25.00	[3.35; 76.22]	2			↦
Flor de Lima 2021	0.00	[1.34; 89.11]	1-			\rightarrow
Issa 2021	17.86	[7.63; 36.38]			1	\rightarrow
Lambin 2021	10.71	[3.50; 28.44]	7	-		-
Suzuki 2018	0.00	[1.34; 89.11]	ı —			→
Binda 2021	4.17	[1.04; 15.19]	-	-	-	
Imai 2016	16.67	[4.20; 47.72]			X	→
Random effects model	13.81	[8.45; 21.76]	Ĩ	4	>	_
		-10	0	10	20	30

Discussion and limitations

Discussion

• This is the first meta-analysis to evaluate outcomes of EUS-GBD drainage in MBO

• We report high technical and clinical success rates with relatively low reintervention and AE rates

EUS-GBD drainage is a feasible palliative option in MBO in experienced centers

Limitations

• The results were driven from low-level evidence (case reports and retrospective cohorts)

• There was no statistical comparison comparing outcomes between EUS-GBD and the other

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