

Surgical outcomes after totally minimally invasive Ivor-Lewis Esophagectomy with intrathoracic hand-sewn anastomosis.

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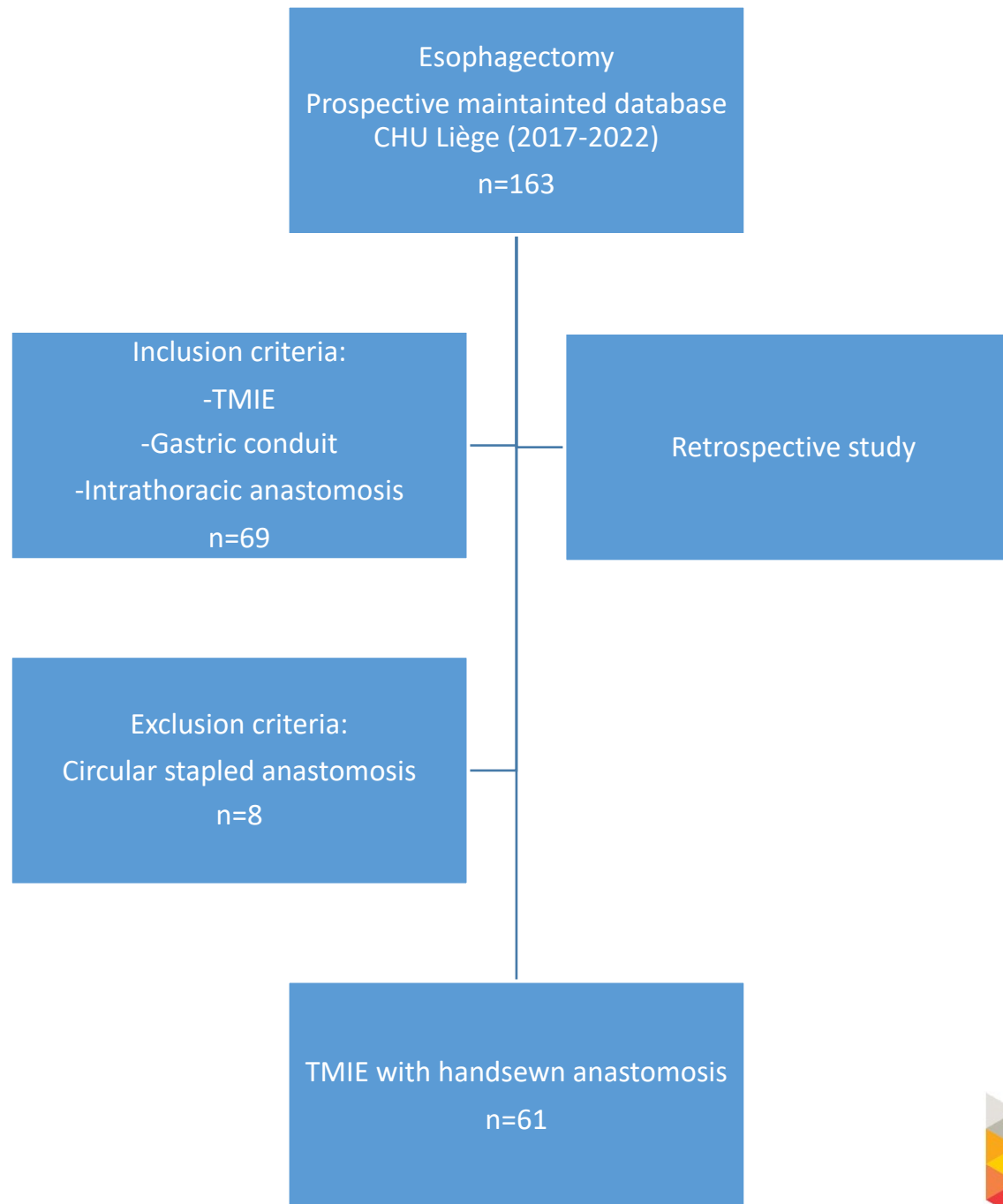
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Introduction

- Totally minimally invasive Ivor-Lewis esophagectomy (TMIE) is increasingly performed around the world*
- This retrospective study reports:
 - perioperative outcomes after TMIE with intrathoracic hand-sewn anastomosis
 - Data are compared to recent literature

*Network meta-analysis of randomized controlled trials on esophagectomies in esophageal cancer: The superiority of minimally invasive surgery, **Lajos Szako and col.** *World J Gastroenterol.* 2022 Aug 14;28(30):4201-4210

Flow-chart of patient selection



Surgical Technique

- General anesthesia and Thoracic epidural anesthesia
- Laparoscopic Gastric Mobilization
- Prone or semi-prone position
- Selective Bronchial intubation
- Thoracoscopic esophagectomy
- Hand-sewn anastomosis
- Blue test and ICG test



Results: Basic characteristics of patients (n=61)

* Results are expressed as N(%), Mean $\pm$ SD, or Median (Q1 – Q3) as appropriate

	Result*
Gender, male	48 (78.7)
Age (years)	66 (61 – 71)
Active or previous smoking	42 (68.9)
BMI (kg/m ²)	27.5 $\pm$ 4.7
Charlson comorbidities index	4 (3 – 5)
ASA score	
1	2 (3.3)
2	36 (59.0)
3	23 (37.7)
Lesion to treat	
Primary	59 (96.7)
Relapse	2 (3.3)
Morphology	
ADK	55 (90.2)
SCC	5 (8.2)
Other	1 (1.6)
Primary localization	
Abdominal/ Lower third oesophagus	38 (62.3)
Gastro-oesophageal junction	22 (36.1)
Thoracic/Middle third oesophagus	1 (1.6)
Clinical T category	
T1b	13 (21.3)
T2	11 (18.0)
T3	37 (60.7)
Clinical N category	
N0	30 (49.2)
N1	27 (44.3)
N2	4 (6.6)
Clinical M category	
M0	61 (100.0)
Prior surgery or endoscopic treatment	
None	56 (91.8)
EMR/ESD	2 (3.3)
Thoracic or abdominal surgery	3 (4.9)
Neoadjuvant treatment	
Chemoradiotherapy	24 (39.3)
Chemotherapy	22 (36.1)
Targeted therapy/biological	1 (1.6)
No adjuvant treatment	14 (23.0)



Peroperative data

** Results are expressed as N(%) or Median (Q1 – Q3)*

Surgery time (min)	301 (271 – 331)
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Peroperative complication	0 (0.0)
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Pathological outcomes

** Results are expressed as
N(%) or Median (Q1 – Q3)*

Resection	
R0	59 (96.7)
R1	1 (1.6)
R2	1 (1.6)
Lymph nodes examined (number)	24 (17 – 35)
Patients with more than 15 LN	56 (92)
Metastatic lymph nodes (number)	0 (0 – 1)

Postoperative complications and Hospital stay

* Results are expressed as N(%) or Median (Q1 – Q3) as appropriate

	Result*	
Pneumonia	12 (19.7)	★
Leak	8 (13.1)	★
Type I	5 (8.2)	
Type II	3 (4.9)	
Conduit necrosis	2 (3.3)	★
Type I	2 (3.3)	
Leak or Conduit necrosis	10 (16.4)	★
Chyle leak	0 (0.0)	★
Complications		
Any	32 (52.5)	
Major (CD≥IIIb)	13 (21.3)	★
None	29 (47.5)	
Anastomic stenosis	3 (4.9)	
Delayed hiatal hernia	3 (4.9)	
Length of stay (days)	13 (12 -20)	★
Length of ICU stay (days)	1 (1 – 3)	
Readmission to ICU	4 (6.6)	
30-days readmission	5 (8.2)	
30-days mortality	1 (1.6)	★
90-days mortality	2 (3.3)	★

Our results
compared to
the literature.
Where are we?

BJS, 2022, 109, 283–270

<https://doi.org/10.1093/bjs/znab432>

Outcomes after totally minimally invasive *versus* hybrid and open Ivor Lewis oesophagectomy: results from the International Esodata Study Group

Berend J. van der Wilk ^{1,*}, Eliza R. C. Hagens ², Ben M. Eyck ¹, Suzanne S. Gisbertz², Richard van Hillegersberg ³, Philippe Naftaux⁴, Wolfgang Schröder⁵, Magnus Nilsson ^{6,7}, Bas P. L. Wijnhoven¹, Sjoerd M. Lagarde^{1,*} and Mark I. van Berge Henegouwen²; on behalf of the International Esodata Study Group Collaborators

Estimated reference proportions of complications were estimated using Wilson method with continuity correction and compared with values of the sample of CHU using Z-test.

Results were considered significant at the 5% critical level ($p < 0.05$).

Comparison of patients characteristics

Proportion values and 95% confidence intervals

	Reference (Berend J. van der Wilk et al. BJS 2022)			CHU	CHU vs TMIE ref
	Totally minimally invasive (n=1472) (TMIE ref)	Hybrid (n=1364)	Open (n=1897)	Totally minimally invasive (n=61)	Z-test p-value
Gender, Male	82 (79.9 – 83.9)	82 (79.8 – 84.0)	82 (80.2 – 83.7)	78.7 (66.0 – 87.7)	0.55
Age (years), Median (Q1 – Q3)	65 (58-71)	64 (57-71)	65 (58-71)	66 (61 – 71)	-
ASA score (%)					
1	9.9 (8.4 – 11.6)	8.7 (7.3 – 10.4)	8 (6.8 – 9.3)	3.3 (0.6 – 12.4)	0.088
2	45 (42.4 – 47.6)	56 (53.3 – 58.7)	46 (43.7 – 48.3)	59.0 (45.7 – 71.2)	0.035
3	43 (40.5 – 45.6)	36 (33.5 – 38.6)	45 (42.7 – 47.3)	37.7 (25.9 – 51.1)	0.42
4	1.9 (1.3 – 2.8)	0.07 (0.0 - 0.5)	0.16 (0.0 - 0.5)	0.0 (0.0 – 7.4)	0.28
5	0 (0.0 – 0.3)	0 (0 – 0.4)	0.05 (0.0 – 0.3)	0.0 (0.0 – 7.4)	-
Primary localization (%)					
Distal ½ of esophagus	58.7 (56.1 – 61.2)	56.4 (53.7 – 59.1)	46.6 (44.3 – 48.9)	62.3 (48.9 – 74.1)	0.58
GOJ	38.5 (36.0 – 41.1)	37.6 (35.0 – 40.3)	49.7 (47.4 – 52.0)	36.1 (24.5 – 49.5)	0.71
Proximal ½ of esophagus	2.8 (2.0 – 3.8)	6.0 (4.8 – 7.4)	3.7 (2.9 – 4.7)	1.6 (0.1 – 9.9)	0.58
Clinical T category (%)					
T0	0.3 (0.1 – 0.8)	0.4 (0.2 – 1.0)	0.2 (0.1 – 0.6)	0.0 (0.0 – 7.4)	0.68
Tis	0.5 (0.2 – 1.1)	0.3 (0.1 – 0.8)	0.8 (0.5 – 1.4)	0.0 (0.0 – 7.4)	0.59
T1/T1b	9.6 (8.2 – 11.3)	6.8 (5.5 – 8.3)	7.1 (6.0 – 8.4)	21.3 (12.3 – 34.0)	0.0028
T2	17.8 (15.9 – 19.9)	12.4 (10.7 – 14.4)	15.0 (13.4 – 16.7)	18.0 (9.7 – 30.4)	0.96
T3	65.1 (62.6 – 67.5)	77.7 (75.4 – 79.9)	70.3 (68.2 – 72.4)	60.7 (47.4 – 72.7)	0.48
T4	5.3 (4.2 – 6.6)	1.9 (1.3 – 2.8)	4.9 (4.0 – 6.0)	0.0 (0.0 – 7.4)	0.065
Tx	1.5 (1.0 – 2.3)	0.6 (0.3 – 1.2)	1.8 (1.3 – 2.5)	0.0 (0.0 – 7.4)	0.33
Clinical N category (%)					
N0	37.5 (35.0 – 40.1)	17.6 (15.6 – 19.8)	39.3 (37.1 – 41.6)	49.2 (36.3 – 62.2)	0.065
N1	38.2 (35.7 – 40.8)	30.0 (27.6 – 32.5)	37.3 (35.1 – 39.6)	44.3 (31.8 – 57.5)	0.34
N2	15.6 (13.8 – 17.6)	7.5 (6.2 – 9.1)	15.3 (13.7 – 17.0)	6.6 (2.1 – 163.8)	0.055
N3	2.2 (1.5 – 3.1)	0.8 (0.4 – 1.5)	3.3 (2.6 – 4.2)	0.0 (0.0 – 7.4)	0.24
Nx	6.6 (5.4 – 8.0)	44.1 (41.4 – 46.8)	4.8 (3.9 – 5.9)	0.0 (0.0 – 7.4)	0.039
Neoadjuvant treatment (%)					
Chemoradiotherapy	67.1 (64.6 – 69.5)	50.9 (48.2 – 53.6)	41.3 (39.1 – 43.6)	39.3 (27.3 – 52.6)	<0.0001
Chemotherapy	14.6 (12.8 – 16.5)	31.6 (29.1 – 34.2)	39.5 (37.3 – 41.8)	36.1 (24.5 – 49.5)	<0.0001
Targeted therapy/biological	0 (0.0 – 0.3)	0 (0.0 – 0.4)	0 (0.0 – 0.3)	1.6 (0.1 – 9.9)	<0.0001
Radiotherapy	0.1 (0.0 – 0.4)	0.2 (0.0 – 0.7)	0.1 (0.0 – 0.4)	0.0 (0.0 – 7.4)	0.84
No adjuvant treatment	18.3 (16.4 – 20.4)	17.4 (15.4 – 19.6)	19.1 (17.3 – 21.0)	23.0 (13.6 – 35.9)	0.36



Complications and Hospital stay

Proportion values and 95% confidence intervals

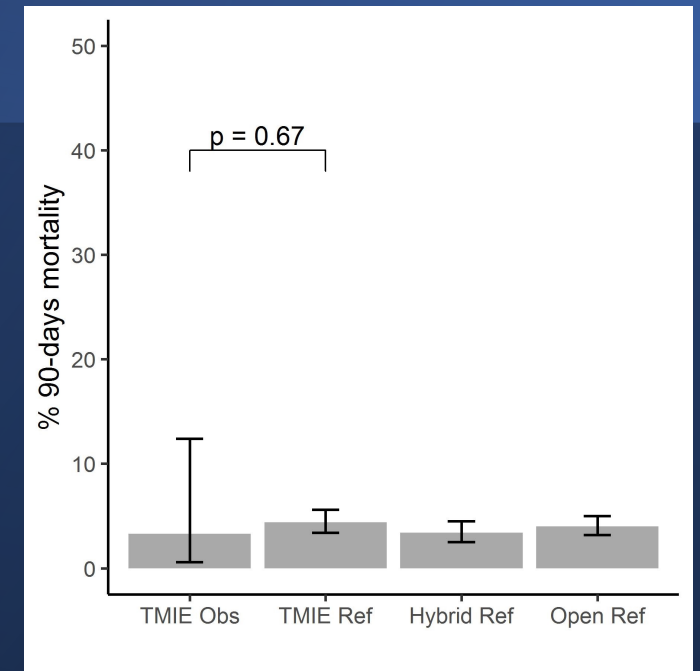
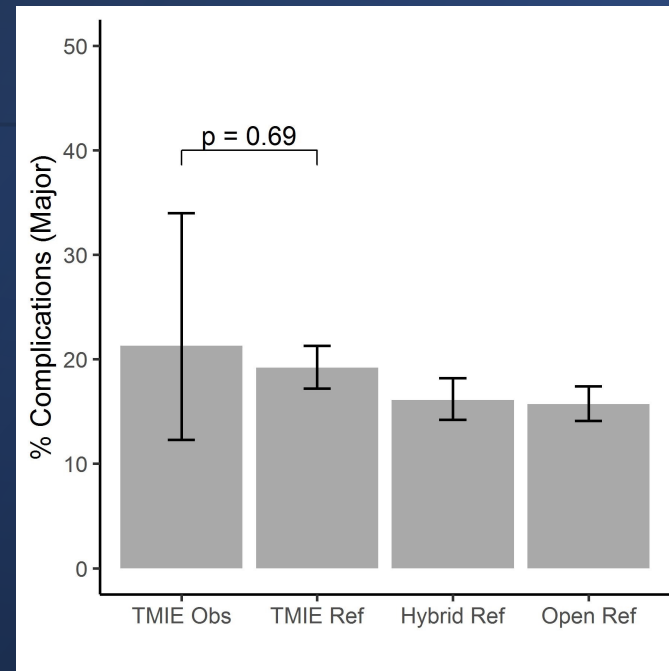
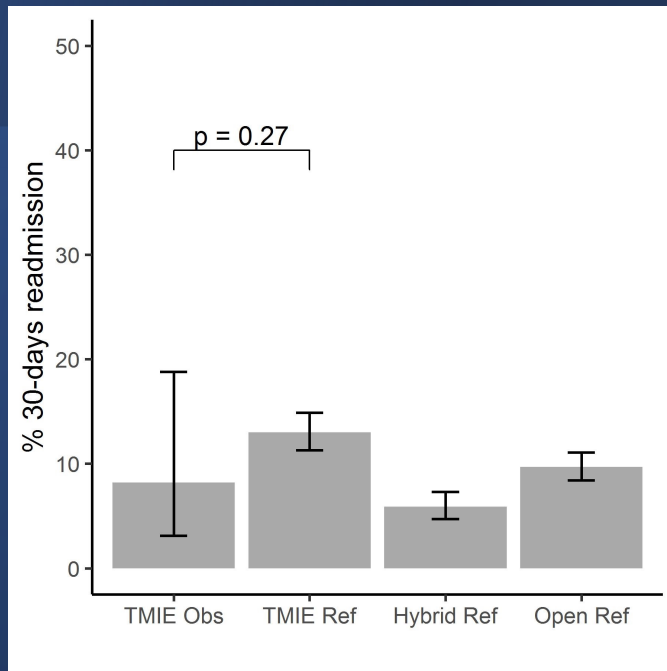
	Reference (Berend J. van der Wilk et al. BJS 2022)			CHU	CHU vs TMIE ref
	Totally minimally invasive (TMIE ref)	Hybrid	Open	Totally minimally invasive	Z-test p-value
Pneumonia (%)	10.9 (9.4 – 12.6)	16.3 (14.4 – 18.4)	17.4 (15.7 – 19.2)	19.7 (11.0 – 32.2)	0.033
Leak (%)	15.1 (13.3 – 17.1)	10.7 (9.1 – 12.5)	7.3 (6.2 – 8.6)	13.1 (6.2 – 24.7)	0.67
Type I	2.6 (1.9 – 3.6)	1.4 (0.9 – 2.2)	2.7 (2.0 – 3.6)	8.2 (3.1 – 18.8)	0.011
Type II	7.7 (6.4 – 9.2)	5.8 (4.6 – 7.2)	2.7 (2.0 – 3.6)	4.9 (1.3 – 14.6)	0.42
Type III	4.8 (3.8 – 6.1)	3.5 (2.6 – 4.7)	1.9 (1.4 – 2.6)	0.0 (0.0 – 7.4)	0.081
Leak or Conduit necrosis (%)				16.4 (8.6 – 28.6)	0.78
Complications (%)					
Any	59.9 (57.3 – 62.4)	62.7 (60.1 – 65.3)	58.0 (55.7 – 60.2)	52.5 (39.4 – 65.3)	0.25
Major (CD≥IIIb)	19.2 (17.2 – 21.3)	16.1 (14.2 – 18.2)	15.7 (14.1 – 17.4)	21.3 (12.3 – 34.0)	0.69
Length of stay (days)	10 (8 -16)*	14 (11 – 19)*	11 (9 – 16) *	13 (12 – 20)*	
30-days readmission (%)	13.0 (11.3 – 14.9)	5.9 (4.7 – 7.3)	9.7 (8.4 – 11.1)	8.2 (3.1 – 18.8)	0.27
90-days mortality (%)	4.4 (3.4 – 5.6)	3.4 (2.5 – 4.5)	4.0 (3.2 – 5.0)	3.3 (0.6 – 12.4)	0.67

* Median (Q1-Q3)

Estimated reference proportions of complications were estimated using Wilson method with continuity correction and compared with values of the sample of CHU using Z-test.

Results were considered significant at the 5% critical level ($p < 0.05$).

Complications and Hospital stay



Comparison of Pathological outcomes

*Proportion values and 95%
confidence intervals

	Reference (Berend J. van der Wilk et al. BJS 2022)			CHU	CHU vs TMIE ref
	Totally minimally invasive (TMIE ref)	Hybrid	Open	Totally minimally invasive	Z-test p-value
Radicality of resection (%)*					
R0	95.2 (93.9 – 96.2)	94.6 (93.2 – 95.7)	91.5 (91.1 – 92.7)	96.7 (87.6 – 99.4)	0.58
R1	4.8 (3.8 – 6.1)	5.2 (4.1 – 6.6)	8.2 (7.0 – 9.6)	1.6 (0.1 – 9.9)	0.25
R2	0 (0.0 – 0.3)	0.1 (0.0 – 0.5)	0.3 (0.1 – 0.7)	1.6 (0.1 – 9.9)	-
Lymph nodes examined, Med (Q1 – Q3)	30 (21 – 40)	29 (22-37)	26 (19 – 34)	24 (17 – 35)	-
Metastatic lymph nodes, Med (Q1 – Q3)	0 (0 – 2)	0 (0 – 2)	0 (0 – 2)	0 (0 – 1)	-

Conclusions

- **TMIE** with intrathoracic hand-sewn anastomosis is a feasible, reproducible and safe procedure
- **Pathological outcomes** are good and comparable to the literature
- Significant higher rate (**19.7 vs 10.9**, p-value=0.033) of **pneumonia** in our experience (registration? ASA 2 higher in our data?)
- **Leak rate (13.1 vs 15.1**, p-value=0.67) and **major complications(CD≥IIIb) rate (21.3 vs 19.2**, p-value=0.69) were similar compared to the literature with a higher rate of **leak type 1 (8.2 vs 2.6**, p-value=0.011)
- No **chyle leak** in our experience
- **Length of stay** are similar (13 (12-20) vs 10 (8-16))
- **90-day mortality rate** is low in our experience with **3.3 %** (0.6-12.4) and is comparable to the literature selected (TMIE: **4.4 %** (3.4-5.6), Z test p-value= 0.67)

Thank you for your attention