

SwissVasc Overall Annual Report 2023

Lorenz Meuli MD MSc, Thomas Lattmann MD & Florian Dick MD

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1 Introduction

This report is provided free of charge for all clinics participating in SwissVasc. Data is summarized by the year of intervention (OP date) and compared with the preceding year (2021 versus 2020) if not stated otherwise.

1.1 Statistical Analysis

Number of procedures and patient's characteristics are summarized and presented by tables. Continuous variables were summarized by mean $\pm$ standard deviation if normally distributed or by median and range if skewed. Continuous variables are compared using student's t-test if normally distributed or Mann-Whitney-U test if skewed, respectively. Normality was tested using the Shapiro-Wilk test. Categorical variables were summarized with counts and percentages for each level of the variable and compared using Pearson's Chi2 test. All analyses were done with R-Studio, version 3.6.3 (R Core Team (2020). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>), on MacOS version 11.4, all p-values are two-sided.

1.2 SwissVasc Dataexport

Date of data export: 19th of April 2024.

A minimum set of information is required to be included in this analysis:

- Date of procedure, date of admission, and date of discharge must be reported.

Data must be plausible:

- Length of Stay must be >0 days (i.e. date of discharge must be $>$ than date of admission).
- Age must be > 0 years (i.e. date of birth must be $>$ than date of admission).
- Date must be plausible (i.e. segment and treatment must be a plausible combination).

1.3 Use of Figures and Tables

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1.4 Errors

Please report inconsistencies or mistakes of this report to lorenz.meuli@pm.me

2 Participating Hospitals 2023

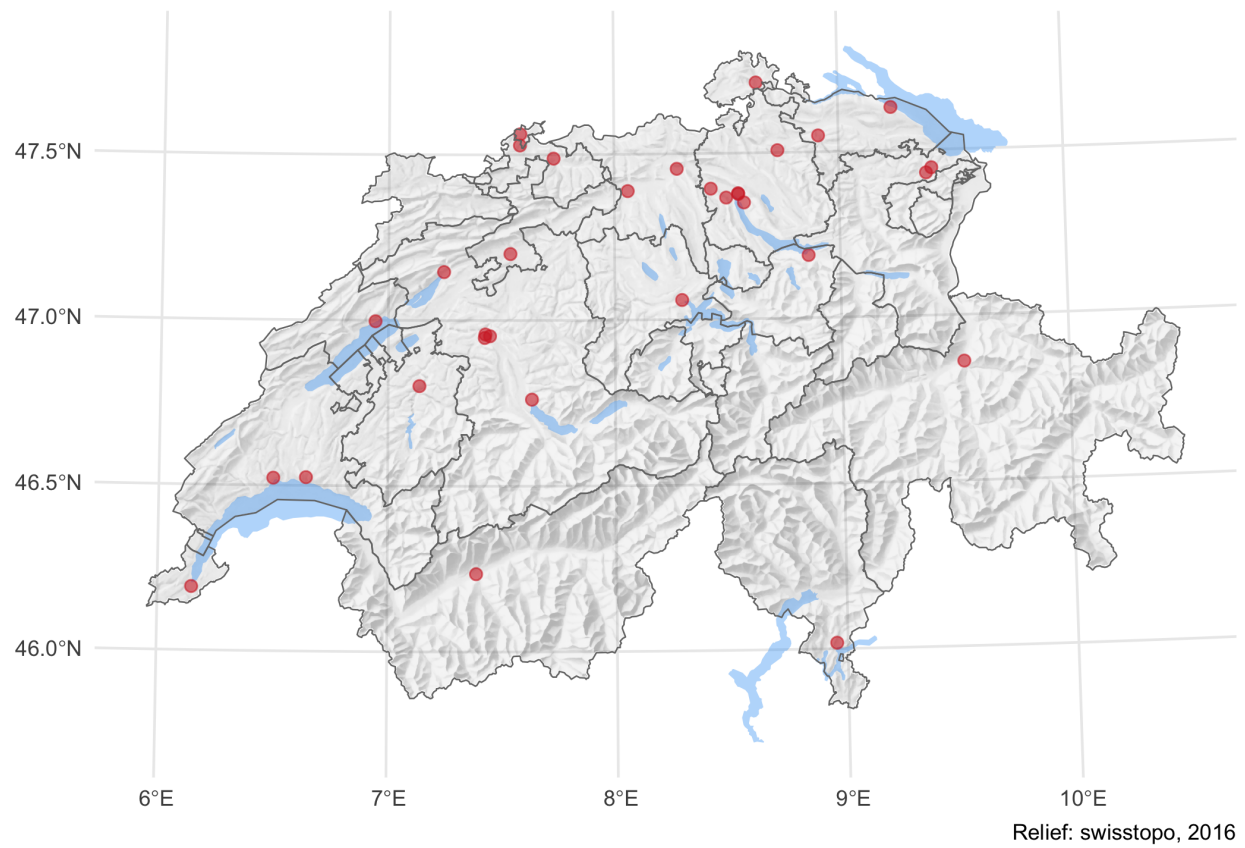


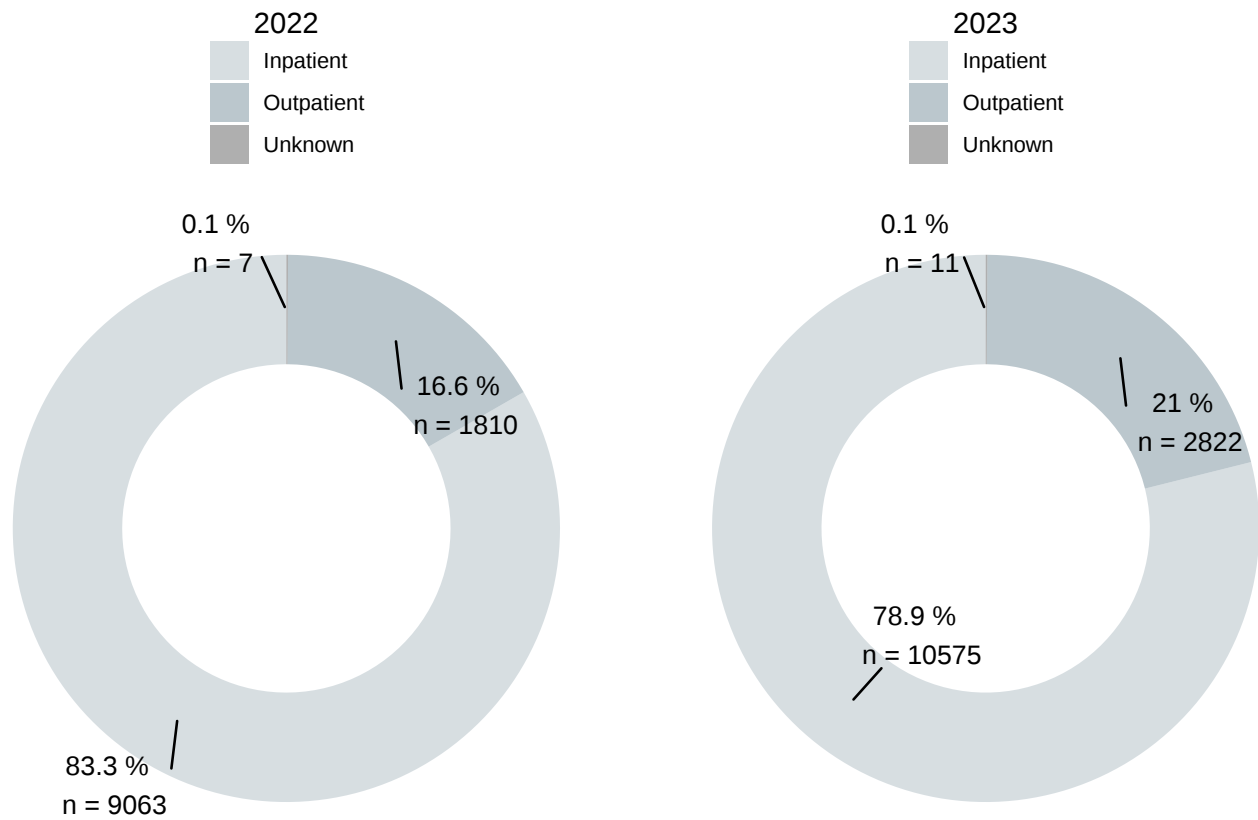
Figure 1: All participating Hospitals - Geolocations

3 All Interventions

Table 1: General Overview

OPYear	2022	2023
Cases	6357	8559
Patients	7913	9872
Operationen	10880	13408
Inpatient Operationen	9063	10575
Outpatient Operationen	1810	2822
Procedures	14406	18662

3.1 Inpatient versus Outpatient Surgery



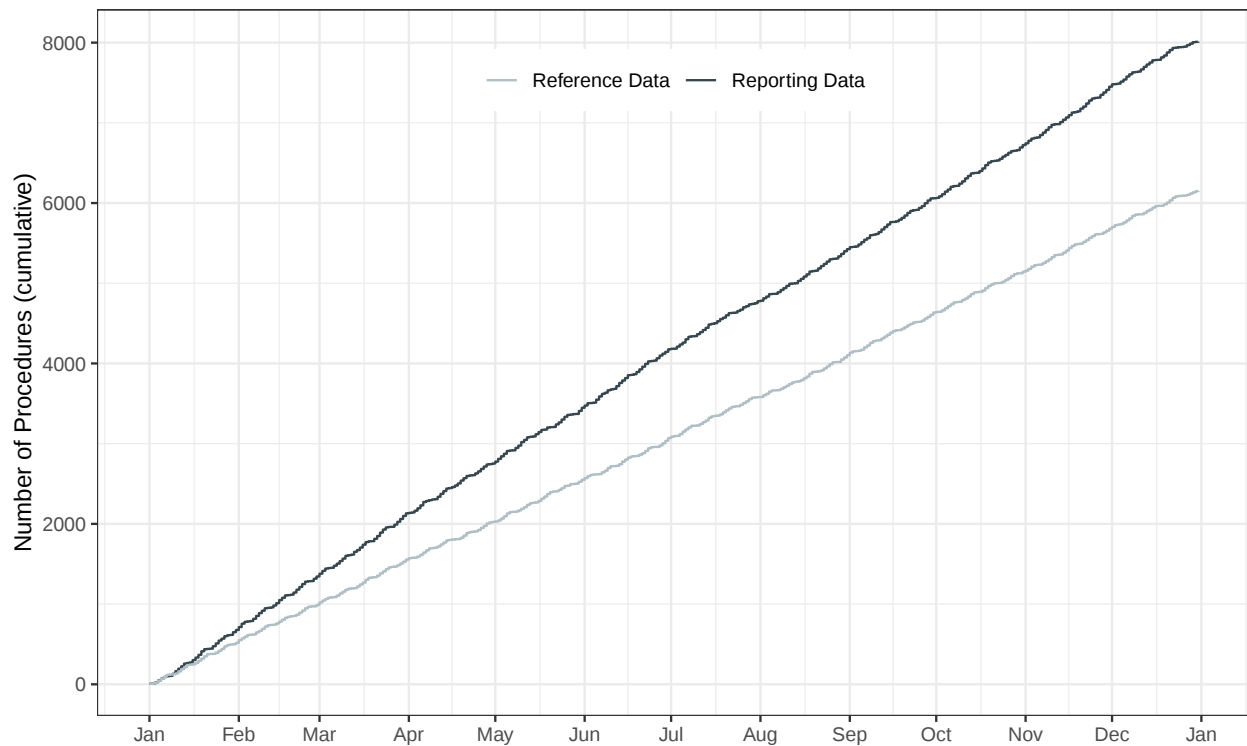
4 Overview of Vascular Interventions

Table 2: Overview on Vascular Procedures

OPYear	2022	2023
Cases	4060	5609
Patients	5355	6680
Operationen	6152	8012
Inpatient Operationen	5889	7329
Outpatient Operationen	260	675
Procedures	8094	10513

Vascular interventions include all procedures where the “technical approach” was either “open surgery” or “endovascular intervention”. Procedures for superficial veins of the lower limb (i.e. surgery for varicose veins) and procedures, where no vascular segment was defined, were excluded.

4.1 Cumulative Incidence of all Vascular Operations - Year-on-Year Change



5 Treatment of the supraaortic Arteries

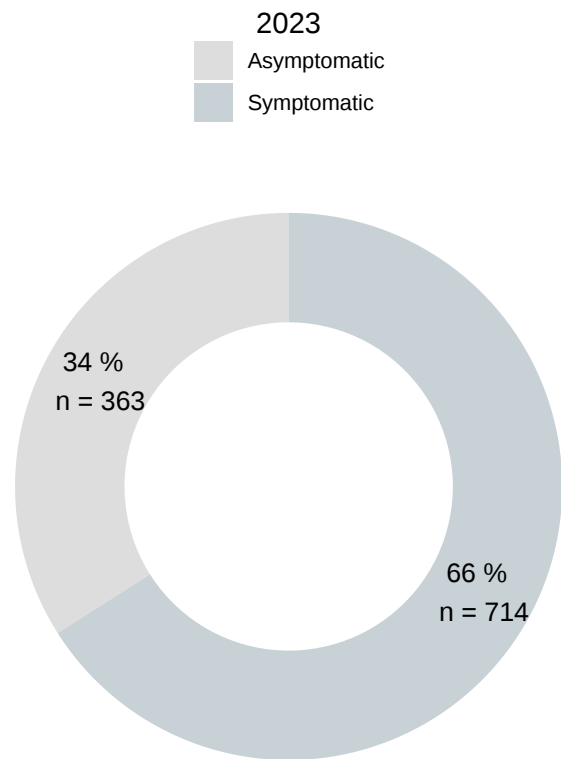
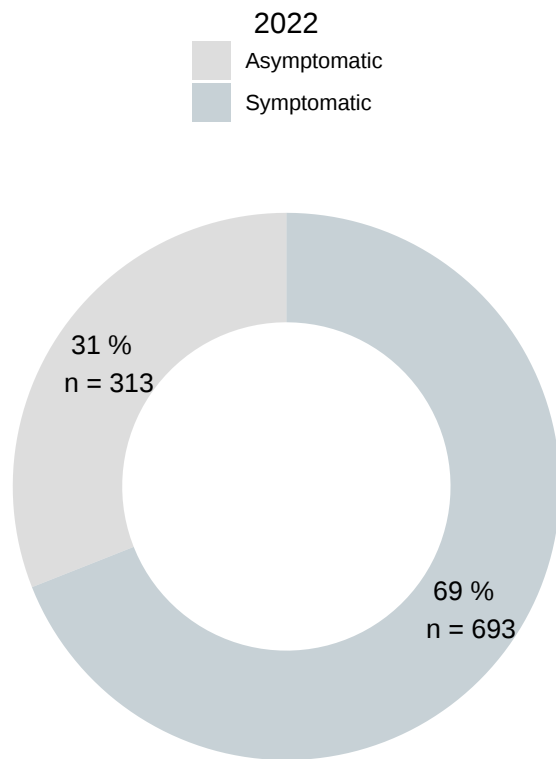
Your clinic performed 1202 procedures on supraaortic arteries in 1096 operations in 2023.

5.1 Treatment of Carotid Stenosis (CEA & CAS)

Table 3: Endarterectomy and Stenting of the Carotid Bifurcation

	2022 (N=1008)	2023 (N=1080)	p value
Technical Approach			
Open surgery	820 (81.3%)	834 (77.2%)	
Endovascular intervention	188 (18.7%)	246 (22.8%)	
No vascular procedure	0 (0.0%)	0 (0.0%)	
Clinical Problem			0.207
N-Miss	2	3	
Asymptomatic	313 (31.1%)	363 (33.7%)	
Symptomatic	693 (68.9%)	714 (66.3%)	
Inflow Optimization			0.001
N-Miss	234	220	
Same Approach	0 (0.0%)	15 (1.7%)	
Hybrid Approach	2 (0.3%)	2 (0.2%)	
No Inflow Optimization	772 (99.7%)	843 (98.0%)	
Sex			0.667
N-Miss	0	1	
Male	714 (70.8%)	755 (70.0%)	
Female	294 (29.2%)	324 (30.0%)	
Age (years)			0.665
Mean (SD)	73.4 (9.8)	73.2 (9.8)	
Range	20.0 - 96.0	40.0 - 97.0	
Complication at Discharge			0.283
N-Miss	238	251	
No	656 (85.2%)	690 (83.2%)	
Yes	114 (14.8%)	139 (16.8%)	
droplevels(ClavienDindo)			0.398
N-Miss	238	251	
Grade 0 - No Complication	656 (85.2%)	690 (83.2%)	
Grade I	24 (3.1%)	27 (3.3%)	
Grade I disability	13 (1.7%)	15 (1.8%)	
Grade II	43 (5.6%)	38 (4.6%)	
Grade II disability	7 (0.9%)	8 (1.0%)	
Grade IIIa	4 (0.5%)	5 (0.6%)	
Grade IIIa disability	1 (0.1%)	1 (0.1%)	
Grade IIIb	15 (1.9%)	29 (3.5%)	
Grade IIIb disability	3 (0.4%)	1 (0.1%)	
Grade IVa	2 (0.3%)	9 (1.1%)	
Grade IVa disability	0 (0.0%)	2 (0.2%)	
Grade IVb disability	0 (0.0%)	1 (0.1%)	
Grade V - Death	2 (0.3%)	3 (0.4%)	
30d Reconstruction patency			< 0.001
Yes	582 (57.7%)	513 (47.5%)	
No	6 (0.6%)	8 (0.7%)	
Missing	420 (41.7%)	559 (51.8%)	

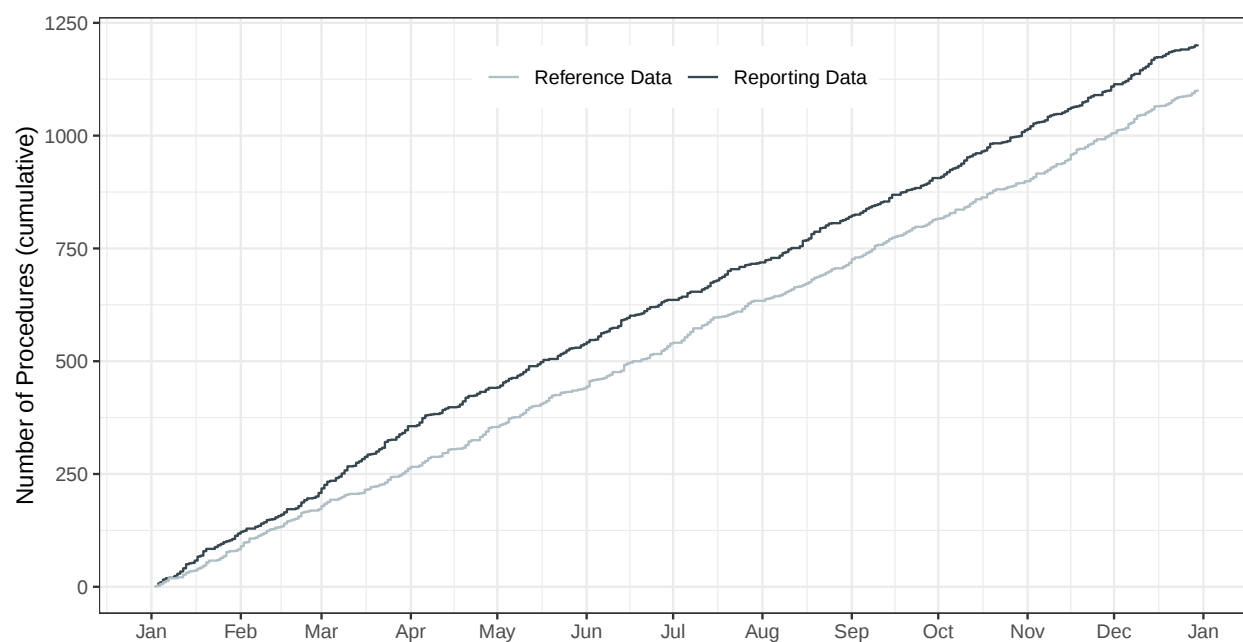
5.1.1 Clinical Problem



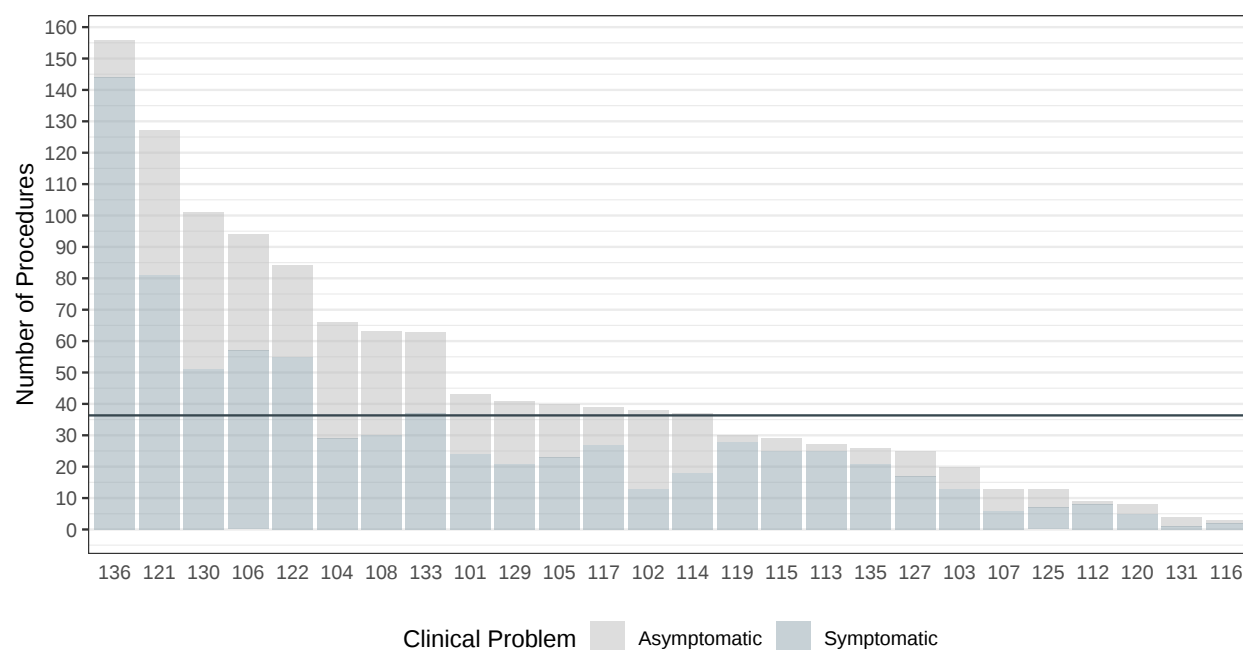
5.2 Other Interventions on Supraaortic Arteries in 2023

- 6 procedures for glomus tumors or other tumors affecting the carotid arteries.
- 5 procedures for thoracic outlet syndrom.
- 30 procedures for debranching or rebranching of supraaortic arteries.
- 30 procedures for symptomatic occlusion of the subclavian artery or the brachiocephalic trunk.
- 51 other procedures on supraaortic arteries.

5.3 Treatment of Supraaortic Arteries - Year-on-Year Change



5.4 Treatment of Supraaortic Arteries in 2023 - National Overview



6 Treatment of Arteries of the Upper Extremity

Table 4: Surgery for Acute Ischemia of the Upper Extremity

	2022 (N=79)	2023 (N=125)
Vascular Intervention		
Vascular graft	10 (12.7%)	12 (9.6%)
Bifurcated graft	1 (1.3%)	3 (2.4%)
Repair of vessel wall	3 (3.8%)	5 (4.0%)
Isolated dilatation (PTA/Stent)	10 (12.7%)	20 (16.0%)
Mural desobliteration w/wo patch	14 (17.7%)	16 (12.8%)
Luminal desobliteration (e.g. embolectomy)	41 (51.9%)	67 (53.6%)
De-/rebranching	0 (0.0%)	1 (0.8%)
Imaging	0 (0.0%)	1 (0.8%)
Sex		
Male	39 (49.4%)	62 (49.6%)
Female	40 (50.6%)	63 (50.4%)
Age (years)		
Mean (SD)	72.4 (15.7)	67.3 (16.5)
Range	26.0 - 95.0	12.0 - 94.0
Complication at Discharge		
N-Miss	18	20
No	49 (80.3%)	70 (66.7%)
Yes	12 (19.7%)	35 (33.3%)
Clavien Dindo at Discharge		
N-Miss	18	20
Grade 0 - No Complication	49 (80.3%)	70 (66.7%)
Grade I	2 (3.3%)	0 (0.0%)
Grade I disability	1 (1.6%)	0 (0.0%)
Grade II	5 (8.2%)	12 (11.4%)
Grade II disability	1 (1.6%)	0 (0.0%)
Grade IIIa	0 (0.0%)	1 (1.0%)
Grade IIIb	2 (3.3%)	5 (4.8%)
Grade IVa	0 (0.0%)	2 (1.9%)
Grade IVb	0 (0.0%)	6 (5.7%)
Grade V - Death	1 (1.6%)	9 (8.6%)
30d Reconstruction patency		
Yes	16 (20.3%)	42 (33.6%)
No	0 (0.0%)	2 (1.6%)
Missing	63 (79.7%)	81 (64.8%)

Table 5: Surgery for Vascular Wall Injury and Pseudoaneurysms

	2022 (N=16)	2023 (N=22)
Clinical Problem		
No problem	1 (6.2%)	5 (22.7%)
Bleeding	13 (81.2%)	11 (50.0%)
Local swelling, inflammation or displacement	2 (12.5%)	5 (22.7%)
Pathologic AV-fistula	0 (0.0%)	1 (4.5%)
Sterility		
Infected or presumably infected	1 (6.2%)	0 (0.0%)
Sterile operation	15 (93.8%)	22 (100.0%)

	2022 (N=16)	2023 (N=22)
Sex		
Male	8 (50.0%)	12 (54.5%)
Female	8 (50.0%)	10 (45.5%)
Age (years)		
Mean (SD)	67.3 (21.7)	62.9 (21.1)
Range	21.0 - 88.0	9.0 - 83.0
Complication at Discharge		
N-Miss	7	7
No	8 (88.9%)	14 (93.3%)
Yes	1 (11.1%)	1 (6.7%)

Note: Patients with vascular wall injuries and pseudoaneurysms presenting with acute ischemia, distal embolisation, or otherwise symptomatic are included in the table “Surgery for Acute Ischemia of the Upper Extremity” if the clinical presentation was coded accordingly.

Table 6: Other Interventions on Upper Extremity Arteries

	2022 (N=29)	2023 (N=57)	p value
Clinical Problem			0.443
No problem	17 (58.6%)	23 (40.4%)	
Bleeding	2 (6.9%)	3 (5.3%)	
Local swelling, inflammation or displacement	0 (0.0%)	2 (3.5%)	
Chronic relative ischemia	7 (24.1%)	22 (38.6%)	
Chronic critical ischemia	3 (10.3%)	7 (12.3%)	
Sterility			0.003
Sterile operation	29 (100.0%)	57 (100.0%)	
Sex			0.053
Male	22 (75.9%)	31 (54.4%)	
Female	7 (24.1%)	26 (45.6%)	
Age (years)			0.475
Mean (SD)	66.6 (15.6)	64.3 (13.8)	
Range	22.0 - 88.0	21.0 - 93.0	
Complication at Discharge			0.296
N-Miss	5	6	
No	12 (50.0%)	32 (62.7%)	
Yes	12 (50.0%)	19 (37.3%)	
Clavien Dindo at Discharge			0.713
N-Miss	5	6	
Grade 0 - No Complication	12 (50.0%)	32 (62.7%)	
Grade I	2 (8.3%)	4 (7.8%)	
Grade II	4 (16.7%)	4 (7.8%)	
Grade II disability	1 (4.2%)	1 (2.0%)	
Grade IIIa	1 (4.2%)	2 (3.9%)	
Grade IIIb	3 (12.5%)	7 (13.7%)	
Grade IVb	0 (0.0%)	1 (2.0%)	
Grade V - Death	1 (4.2%)	0 (0.0%)	
30d Reconstruction patency			0.604
Yes	10 (34.5%)	26 (45.6%)	
No	1 (3.4%)	2 (3.5%)	
Missing	18 (62.1%)	29 (50.9%)	

7 Surgery of the Abdominal Aorta and the Iliac Arteries

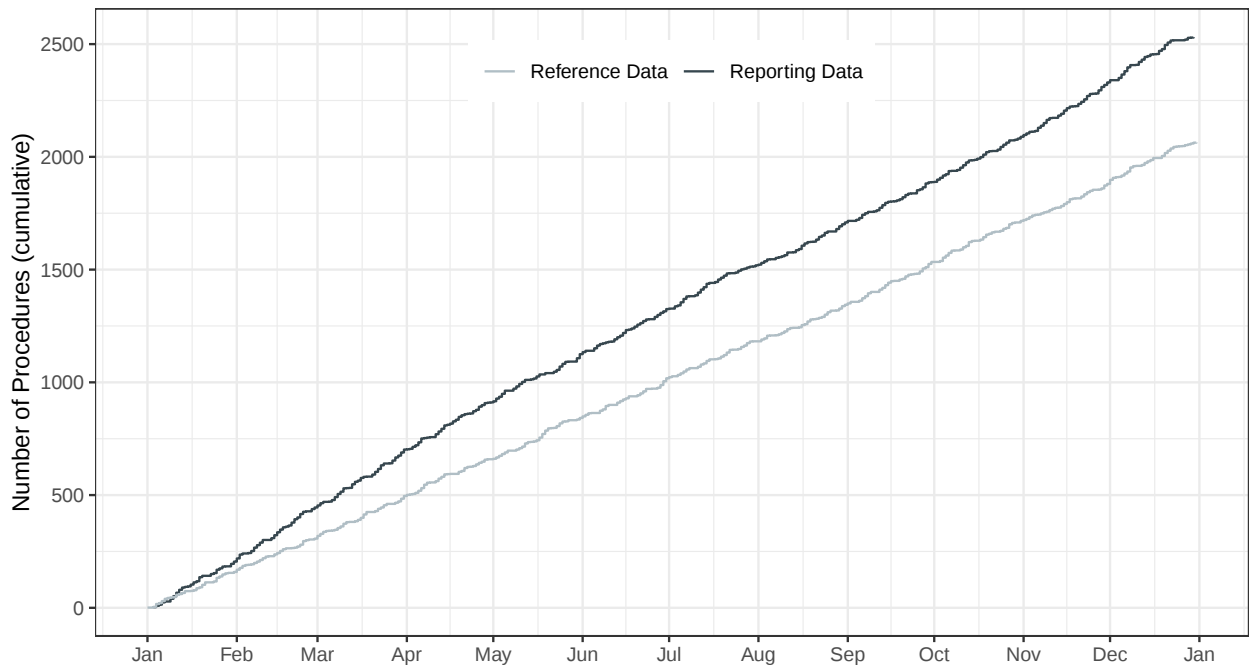
7.1 Overview

Table 7: Overview - Abdominal Aorta and Iliac Arteries

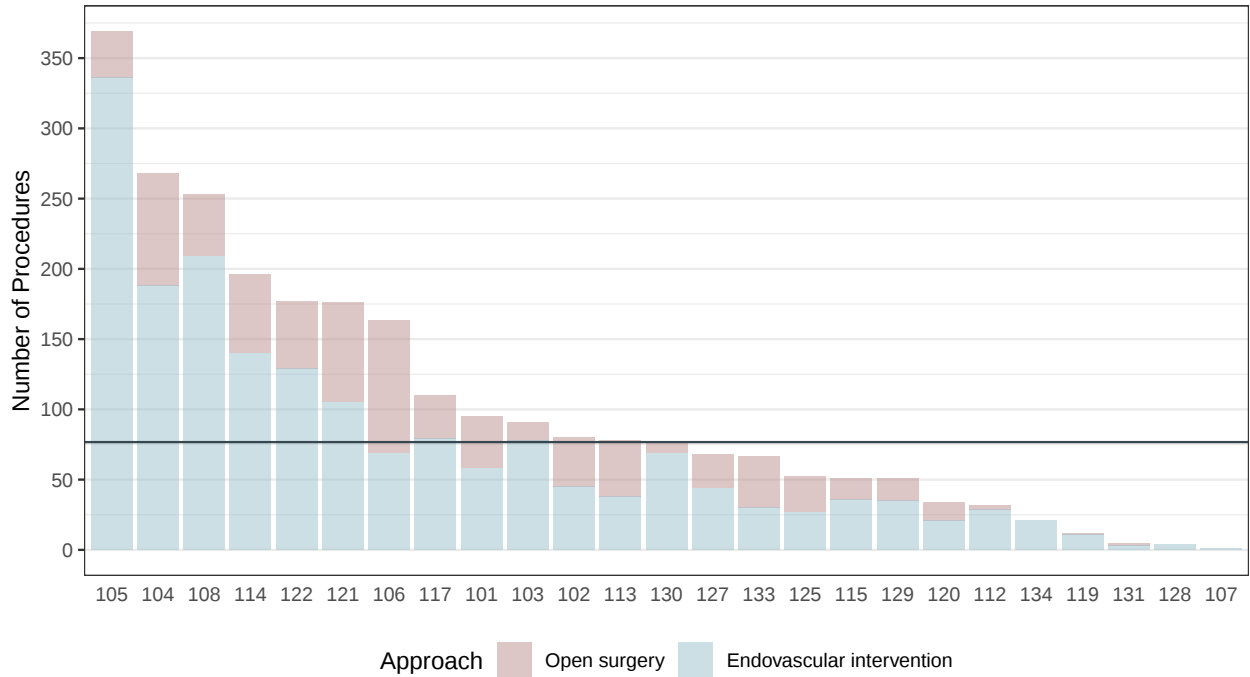
	2022 (N=2064)	2023 (N=2531)	p value
Segment			< 0.001
Thoracoabdominal Crawford 4	50 (2.4%)	91 (3.6%)	
Aorto-iliac including suprarenal segment	274 (13.3%)	300 (11.9%)	
Aorto-iliac including infrarenal segment	951 (46.1%)	1002 (39.6%)	
Isolated iliac arteries	789 (38.2%)	1138 (45.0%)	
Technical Approach			< 0.001
Open surgery	761 (36.9%)	726 (28.7%)	
Endovascular intervention	1303 (63.1%)	1805 (71.3%)	
Leading Pathology			0.002
N-Miss	0	13	
No vascular pathology	40 (1.9%)	30 (1.2%)	
Vascular wall injury / pseudoaneurysm	80 (3.9%)	78 (3.1%)	
Aneurysm (true)	1074 (52.0%)	1201 (47.7%)	
Inflammatory aneurysm (sterile)	5 (0.2%)	10 (0.4%)	
Dissection without aneurysm formation	33 (1.6%)	33 (1.3%)	
Dissection with aneurysm formation	22 (1.1%)	21 (0.8%)	
Obstruction intraluminally	114 (5.5%)	146 (5.8%)	
Obstruction wall pathology	607 (29.4%)	903 (35.9%)	
Obstruction by external compression	12 (0.6%)	17 (0.7%)	
AV-malformation	2 (0.1%)	0 (0.0%)	
Source of emboli w/o pathology of the vessel wall	0 (0.0%)	1 (0.0%)	
Tumor	2 (0.1%)	3 (0.1%)	
Endoleak	73 (3.5%)	75 (3.0%)	
Clinical Problem			< 0.001
N-Miss	3	4	
No problem	1114 (54.1%)	1204 (47.6%)	
Symptomatic	138 (6.7%)	132 (5.2%)	
Bleeding	152 (7.4%)	148 (5.9%)	
Local swelling, inflammation or displacement	17 (0.8%)	21 (0.8%)	
Pathologic AV-fistula	0 (0.0%)	1 (0.0%)	
Acute Ischemia	78 (3.8%)	120 (4.7%)	
Distal embolisation	9 (0.4%)	6 (0.2%)	
Chronic relative ischemia	360 (17.5%)	626 (24.8%)	
Chronic critical ischemia	193 (9.4%)	269 (10.6%)	
Sex			0.009
N-Miss	1	3	
Male	1660 (80.5%)	1954 (77.3%)	
Female	403 (19.5%)	574 (22.7%)	
Age (years)			0.119
N-Miss	3	1	
Mean (SD)	71.6 (9.6)	71.1 (10.4)	
Range	17.0 - 97.0	13.0 - 96.0	
Complication at Discharge			0.137

	2022 (N=2064)	2023 (N=2531)	p value
N-Miss	272	290	
No	1157 (64.6%)	1497 (66.8%)	
Yes	635 (35.4%)	744 (33.2%)	
Clavien Dindo at Discharge			0.095
N-Miss	272	290	
Grade 0 - No Complication	1157 (64.6%)	1497 (66.8%)	
Grade I	75 (4.2%)	113 (5.0%)	
Grade I disability	13 (0.7%)	16 (0.7%)	
Grade II	244 (13.6%)	263 (11.7%)	
Grade II disability	23 (1.3%)	24 (1.1%)	
Grade IIIa	30 (1.7%)	39 (1.7%)	
Grade IIIa disability	3 (0.2%)	3 (0.1%)	
Grade IIIb	116 (6.5%)	153 (6.8%)	
Grade IIIb disability	15 (0.8%)	7 (0.3%)	
Grade IVa	43 (2.4%)	42 (1.9%)	
Grade IVa disability	12 (0.7%)	4 (0.2%)	
Grade IVb	6 (0.3%)	11 (0.5%)	
Grade IVb disability	1 (0.1%)	4 (0.2%)	
Grade V - Death	54 (3.0%)	65 (2.9%)	
30d Reconstruction patency			< 0.001
Yes	1245 (60.3%)	1344 (53.1%)	
No	60 (2.9%)	66 (2.6%)	
Missing	759 (36.8%)	1121 (44.3%)	

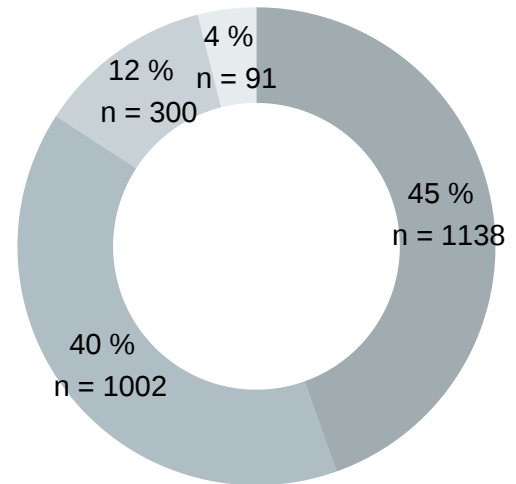
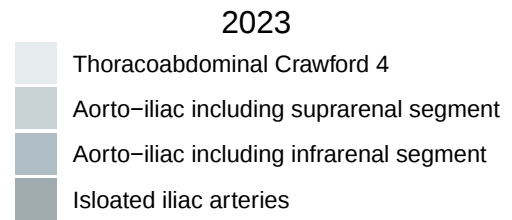
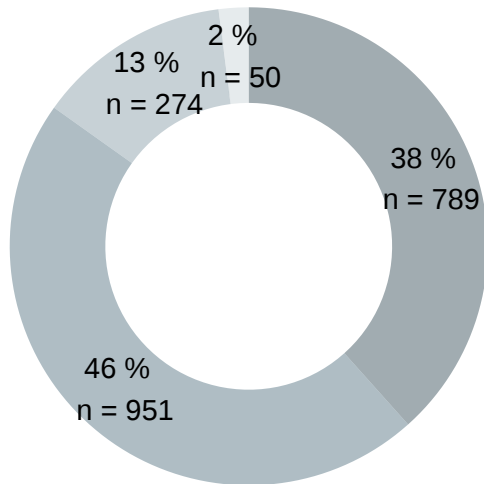
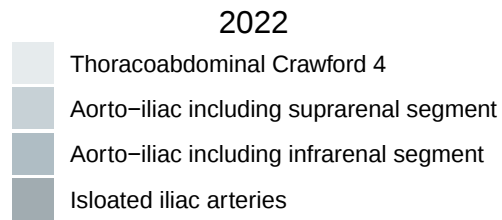
7.1.1 Treatment of the Abdominal Aorta and the Iliac Arteries - Year-on-Year Change



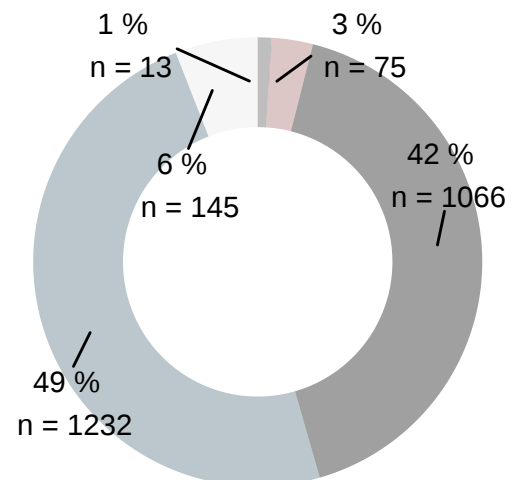
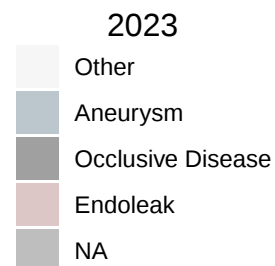
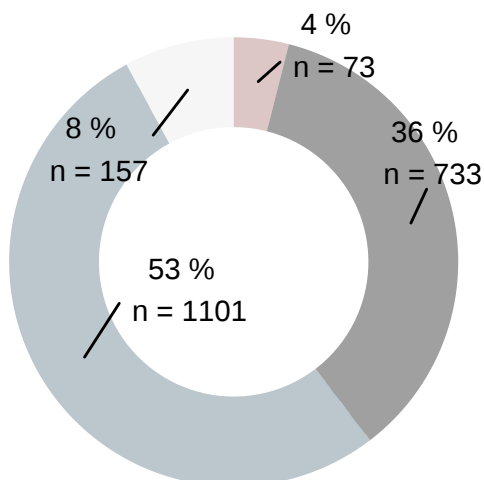
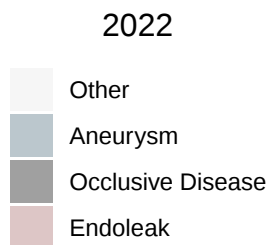
7.1.2 Treatment of the Abdominal Aorta and the Iliac Arteries in 2023 - National Overview



7.1.3 Treated Segments



7.1.4 Treated Pathologies



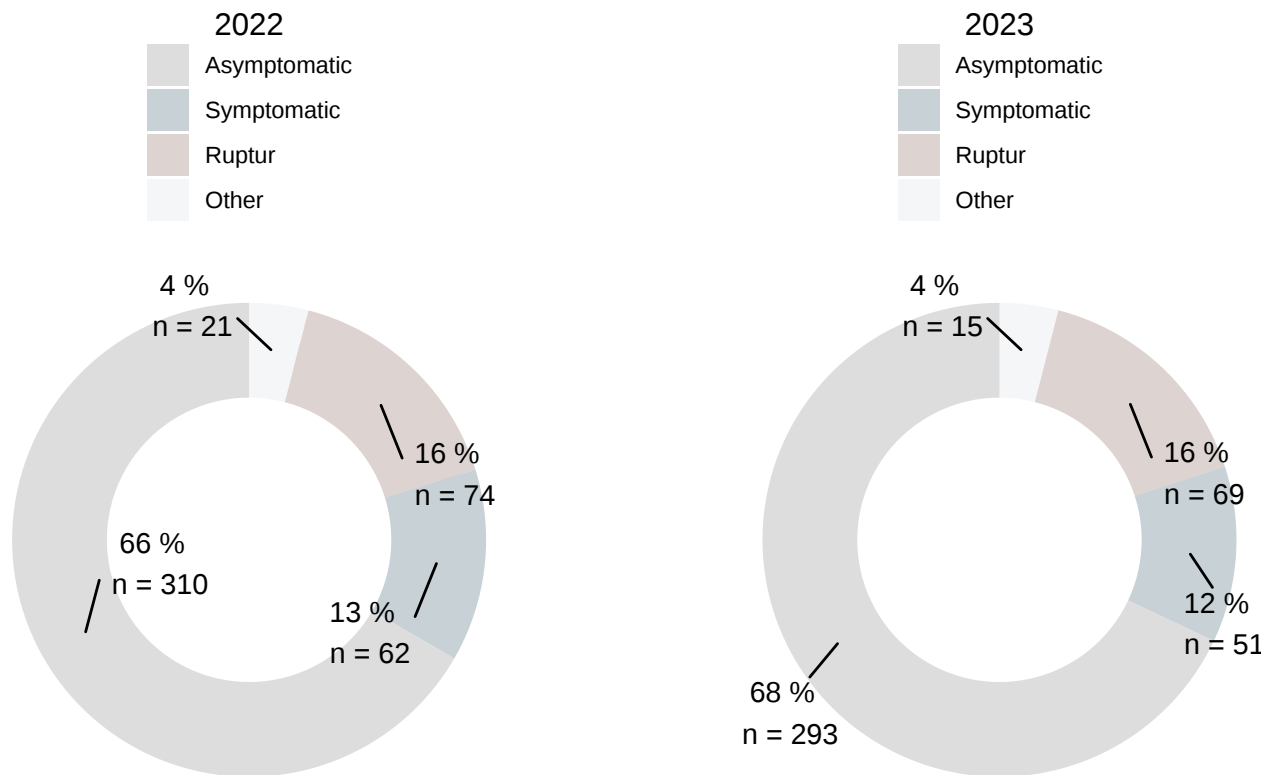
7.2 Open Repair for Aneurysms of the Abdominal Aorta and the Iliac Arteries

Table 8: OR for AAA and Iliac Aneurysms

	2022 (N=467)	2023 (N=428)	p value
Segment			0.399
Thoracoabdominal Crawford 4	11 (2.4%)	5 (1.2%)	
Aorto-iliac including suprarenal segment	171 (36.6%)	167 (39.0%)	
Aorto-iliac including infrarenal segment	237 (50.7%)	220 (51.4%)	
Isolated iliac arteries	48 (10.3%)	36 (8.4%)	
Aneurysm Diameter (mm)			0.571
N-Miss	12	16	
Mean (SD)	60.0 (19.9)	59.3 (17.2)	
Range	0.0 - 150.0	0.0 - 113.0	
Leading Pathology			0.127
Vascular wall injury / pseudoaneurysm	32 (6.9%)	17 (4.0%)	
Aneurysm (true)	415 (88.9%)	392 (91.6%)	
Inflammatory aneurysm (sterile)	5 (1.1%)	9 (2.1%)	
Dissection with aneurysm formation	15 (3.2%)	10 (2.3%)	
Clinical Problem			0.679
No problem	310 (66.4%)	293 (68.5%)	
Symptomatic	62 (13.3%)	51 (11.9%)	
Bleeding	74 (15.8%)	69 (16.1%)	
Local swelling, inflammation or displacement	11 (2.4%)	8 (1.9%)	
Acute Ischemia	1 (0.2%)	0 (0.0%)	
Distal embolisation	3 (0.6%)	0 (0.0%)	
Chronic relative ischemia	5 (1.1%)	5 (1.2%)	
Chronic critical ischemia	1 (0.2%)	2 (0.5%)	
Vascular Intervention			0.108
Vascular graft	148 (31.7%)	143 (33.4%)	
Bifurcated graft	193 (41.3%)	209 (48.8%)	
Complex bifurcated graft (Y + branches)	96 (20.6%)	57 (13.3%)	
Repair of vessel wall	6 (1.3%)	6 (1.4%)	
Mural desobliteration w/wo patch	9 (1.9%)	3 (0.7%)	
Luminal desobliteration (e.g. embolectomy)	2 (0.4%)	1 (0.2%)	
Fenestration (only in dissections)	1 (0.2%)	0 (0.0%)	
Sealing	5 (1.1%)	5 (1.2%)	
Therapeutic occlusion of vessels	4 (0.9%)	2 (0.5%)	
Resection of av-malform	0 (0.0%)	1 (0.2%)	
De-/rebranching	2 (0.4%)	0 (0.0%)	
Imaging	1 (0.2%)	1 (0.2%)	
Sterility			0.670
N-Miss	1	3	
Infected or presumably infected	19 (4.1%)	15 (3.5%)	
Sterile operation	447 (95.9%)	410 (96.5%)	
Previous Interventions			0.539
N-Miss	10	15	
No previous intervention at the same location	417 (91.2%)	381 (92.3%)	
Planned consecutive intervention	3 (0.7%)	1 (0.2%)	
Revision within 30d - inhouse complications	2 (0.4%)	5 (1.2%)	
Revision within 30d - extern complications	2 (0.4%)	2 (0.5%)	
Redo	33 (7.2%)	24 (5.8%)	
Conversion			0.429
N-Miss	12	11	

	2022 (N=467)	2023 (N=428)	p value
No Conversion	435 (95.6%)	403 (96.6%)	0.364
Conversion	20 (4.4%)	14 (3.4%)	
Sex			
Male	408 (87.4%)	365 (85.3%)	0.099
Female	59 (12.6%)	63 (14.7%)	
Age (years)			
Mean (SD)	70.3 (9.1)	69.3 (9.5)	0.847
Range	17.0 - 90.0	13.0 - 89.0	
Complication at Discharge			
N-Miss	32	31	0.821
No	233 (53.6%)	210 (52.9%)	
Yes	202 (46.4%)	187 (47.1%)	
Clavien Dindo at Discharge			
N-Miss	32	31	< 0.001
Grade 0 - No Complication	233 (53.6%)	210 (52.9%)	
Grade I	26 (6.0%)	30 (7.6%)	
Grade I disability	4 (0.9%)	5 (1.3%)	
Grade II	92 (21.1%)	79 (19.9%)	
Grade II disability	11 (2.5%)	7 (1.8%)	
Grade IIIa	7 (1.6%)	4 (1.0%)	
Grade IIIa disability	2 (0.5%)	1 (0.3%)	
Grade IIIb	16 (3.7%)	25 (6.3%)	
Grade IIIb disability	5 (1.1%)	2 (0.5%)	
Grade IVa	15 (3.4%)	13 (3.3%)	
Grade IVa disability	4 (0.9%)	1 (0.3%)	
Grade IVb	3 (0.7%)	2 (0.5%)	
Grade IVb disability	1 (0.2%)	1 (0.3%)	
Grade V - Death	16 (3.7%)	17 (4.3%)	
30d Reconstruction patency			
Yes	354 (75.8%)	269 (62.9%)	< 0.001
No	2 (0.4%)	0 (0.0%)	
Missing	111 (23.8%)	159 (37.1%)	

7.2.1 Indication for Open Repair of the Abdominal Aorta and the Iliac Arteries



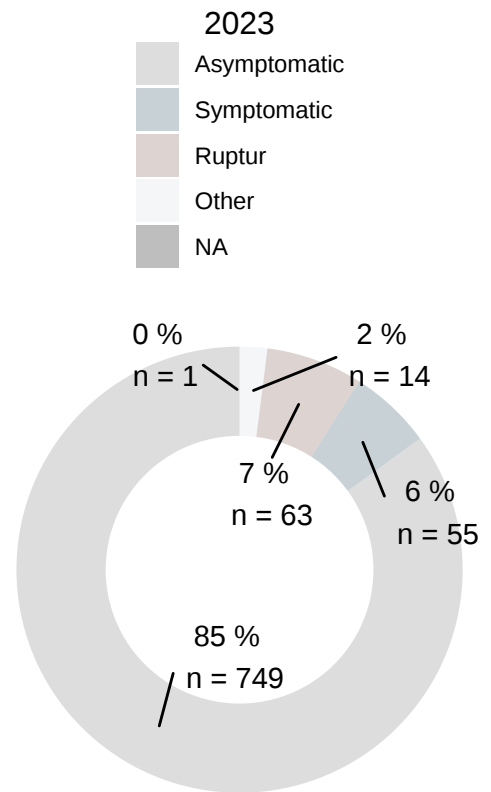
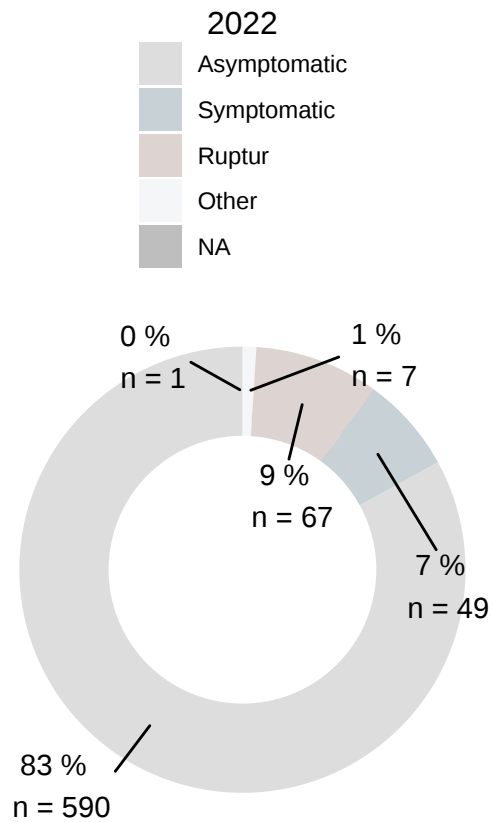
7.3 Endovascular Repair for Aneurysms of the Abdominal Aorta and the Iliac Arteries

Table 9: Endovascular Repair for AAA and Iliacal Aneurysms

	2022 (N=714)	2023 (N=882)	p value
Segment			0.001
Thoracoabdominal Crawford 4	25 (3.5%)	69 (7.8%)	
Aorto-iliac including suprarenal segment	54 (7.6%)	79 (9.0%)	
Aorto-iliac including infrarenal segment	501 (70.2%)	563 (63.8%)	
Isolated iliac arteries	134 (18.8%)	171 (19.4%)	
Maximum Diameter			0.864
N-Miss	27	33	
Mean (SD)	54.9 (15.7)	54.8 (16.1)	
Range	0.0 - 187.0	0.0 - 120.0	
Pathology			0.778
Vascular wall injury / pseudoaneurysm	48 (6.7%)	61 (6.9%)	
Aneurysm (true)	659 (92.3%)	809 (91.7%)	
Inflammatory aneurysm (sterile)	0 (0.0%)	1 (0.1%)	
Dissection with aneurysm formation	7 (1.0%)	11 (1.2%)	
Clinical Problem			0.457
N-Miss	1	1	
No problem	590 (82.7%)	749 (85.0%)	
Symptomatic	49 (6.9%)	55 (6.2%)	
Bleeding	67 (9.4%)	63 (7.2%)	
Local swelling, inflammation or displacement	2 (0.3%)	3 (0.3%)	
Pathologic AV-fistula	0 (0.0%)	1 (0.1%)	
Acute Ischemia	0 (0.0%)	2 (0.2%)	
Distal embolisation	2 (0.3%)	1 (0.1%)	
Chronic relative ischemia	3 (0.4%)	5 (0.6%)	
Chronic critical ischemia	0 (0.0%)	2 (0.2%)	
Vascular Intervention			0.239
Vascular graft	100 (14.0%)	107 (12.1%)	
Bifurcated graft	476 (66.7%)	562 (63.7%)	
Complex bifurcated graft (Y + branches)	87 (12.2%)	143 (16.2%)	
Repair of vessel wall	3 (0.4%)	7 (0.8%)	
Isolated dilatation (PTA/Stent)	24 (3.4%)	34 (3.9%)	
Mural desobliteration w/wo patch	1 (0.1%)	0 (0.0%)	
Sealing	17 (2.4%)	19 (2.2%)	
Therapeutic occlusion of vessels	5 (0.7%)	8 (0.9%)	
De-/rebranching	0 (0.0%)	2 (0.2%)	
Imaging	1 (0.1%)	0 (0.0%)	
Material			< 0.001
Biological Material	2 (0.3%)	1 (0.1%)	
Synthetic Material for Vessel wall	670 (93.8%)	847 (96.0%)	
Coils, Plugs, etc	29 (4.1%)	34 (3.9%)	
No material	13 (1.8%)	0 (0.0%)	
Sterility			0.015
N-Miss	3	2	
Infected or presumably infected	7 (1.0%)	1 (0.1%)	
Sterile operation	704 (99.0%)	879 (99.9%)	
Previous Interventions			0.490
N-Miss	14	10	
No previous intervention at the same location	642 (91.7%)	817 (93.7%)	

	2022 (N=714)	2023 (N=882)	p value
Planned consecutive intervention	26 (3.7%)	24 (2.8%)	
Revision within 30d - inhouse complications	4 (0.6%)	5 (0.6%)	
Revision within 30d - extern complications	1 (0.1%)	0 (0.0%)	
Redo	27 (3.9%)	26 (3.0%)	
Conversion			0.255
N-Miss	22	33	
No Conversion	682 (98.6%)	830 (97.8%)	
Conversion	10 (1.4%)	19 (2.2%)	
Sex			0.825
N-Miss	0	1	
Male	614 (86.0%)	761 (86.4%)	
Female	100 (14.0%)	120 (13.6%)	
Age (years)			0.731
N-Miss	1	1	
Mean (SD)	75.5 (7.6)	75.4 (8.2)	
Range	48.0 - 93.0	45.0 - 96.0	
Complication			0.126
N-Miss	61	77	
No	489 (74.9%)	574 (71.3%)	
Yes	164 (25.1%)	231 (28.7%)	
ClavienDindo			0.587
N-Miss	61	77	
Grade 0 - No Complication	489 (74.9%)	574 (71.3%)	
Grade I	25 (3.8%)	44 (5.5%)	
Grade I disability	4 (0.6%)	8 (1.0%)	
Grade II	58 (8.9%)	81 (10.1%)	
Grade II disability	6 (0.9%)	6 (0.7%)	
Grade IIIa	15 (2.3%)	15 (1.9%)	
Grade IIIa disability	1 (0.2%)	2 (0.2%)	
Grade IIIb	26 (4.0%)	38 (4.7%)	
Grade IIIb disability	1 (0.2%)	3 (0.4%)	
Grade IVa	6 (0.9%)	12 (1.5%)	
Grade IVa disability	2 (0.3%)	0 (0.0%)	
Grade IVb	2 (0.3%)	5 (0.6%)	
Grade V - Death	18 (2.8%)	17 (2.1%)	
30-Day Patency			< 0.001
Yes	456 (63.9%)	482 (54.6%)	
No	48 (6.7%)	37 (4.2%)	
Missing	210 (29.4%)	363 (41.2%)	

7.3.1 Indication for Endovascular Repair of the Abdominal Aorta and the Iliac Arteries



7.4 Open Repair for Occlusive Disease of the Abdominal Aorta and the Iliac Arteries

Table 10: OR for Aortoiliac Occlusive Disease

	2022 (N=254)	2023 (N=261)	p value
Segment			0.722
Thoracoabdominal Crawford 4	4 (1.6%)	5 (1.9%)	
Aorto-iliac including suprarenal segment	28 (11.0%)	34 (13.0%)	
Aorto-iliac including infrarenal segment	122 (48.0%)	113 (43.3%)	
Isolated iliac arteries	100 (39.4%)	109 (41.8%)	
Pathology			0.357
Dissection without aneurysm formation	7 (2.8%)	6 (2.3%)	
Obstruction intraluminally	64 (25.2%)	84 (32.2%)	
Obstruction wall pathology	180 (70.9%)	169 (64.8%)	
Obstruction by external compression	3 (1.2%)	2 (0.8%)	
Clinical Problem			0.385
No problem	18 (7.1%)	15 (5.7%)	
Symptomatic	5 (2.0%)	6 (2.3%)	
Bleeding	1 (0.4%)	0 (0.0%)	
Local swelling, inflammation or displacement	0 (0.0%)	3 (1.1%)	
Acute Ischemia	16 (6.3%)	22 (8.4%)	
Distal embolisation	0 (0.0%)	2 (0.8%)	
Chronic relative ischemia	130 (51.2%)	134 (51.3%)	
Chronic critical ischemia	84 (33.1%)	79 (30.3%)	
Vascular Intervention			0.369
Vascular graft	68 (26.8%)	66 (25.3%)	
Bifurcated graft	65 (25.6%)	83 (31.8%)	
Complex bifurcated graft (Y + branches)	41 (16.1%)	27 (10.3%)	
Repair of vessel wall	0 (0.0%)	2 (0.8%)	
Isolated dilatation (PTA/Stent)	5 (2.0%)	6 (2.3%)	
Mural desobliteration w/wo patch	57 (22.4%)	62 (23.8%)	
Luminal desobliteration (e.g. embolectomy)	17 (6.7%)	14 (5.4%)	
Imaging	1 (0.4%)	1 (0.4%)	
Material			0.166
Autologous Material Only	5 (2.0%)	11 (4.2%)	
Biological Material	23 (9.1%)	30 (11.5%)	
Synthetic Material for Vessel wall	177 (69.7%)	186 (71.3%)	
Coils, Plugs, etc	5 (2.0%)	2 (0.8%)	
No material	44 (17.3%)	32 (12.3%)	
Sterility			0.681
N-Miss	0	1	
Infected or presumably infected	4 (1.6%)	3 (1.2%)	
Sterile operation	250 (98.4%)	257 (98.8%)	
Previous Interventions			0.104
N-Miss	0	2	
No previous intervention at the same location	216 (85.0%)	213 (82.2%)	
Planned consecutive intervention	0 (0.0%)	5 (1.9%)	
Revision within 30d - inhouse complications	4 (1.6%)	10 (3.9%)	
Revision within 30d - extern complications	1 (0.4%)	1 (0.4%)	
Redo	33 (13.0%)	30 (11.6%)	
Conversion			0.465
N-Miss	3	12	
No Conversion	234 (93.2%)	236 (94.8%)	

	2022 (N=254)	2023 (N=261)	p value
Conversion	17 (6.8%)	13 (5.2%)	
Sex			0.833
Male	172 (67.7%)	179 (68.6%)	
Female	82 (32.3%)	82 (31.4%)	
Age (years)			0.779
Mean (SD)	64.8 (10.0)	64.6 (11.0)	
Range	22.0 - 93.0	21.0 - 92.0	
Complication			0.787
N-Miss	29	34	
No	130 (57.8%)	134 (59.0%)	
Yes	95 (42.2%)	93 (41.0%)	
ClavienDindo			0.071
N-Miss	29	34	
Grade 0 - No Complication	130 (57.8%)	134 (59.0%)	
Grade I	6 (2.7%)	9 (4.0%)	
Grade I disability	1 (0.4%)	0 (0.0%)	
Grade II	46 (20.4%)	28 (12.3%)	
Grade II disability	2 (0.9%)	3 (1.3%)	
Grade IIIa	1 (0.4%)	7 (3.1%)	
Grade IIIb	22 (9.8%)	26 (11.5%)	
Grade IIIb disability	4 (1.8%)	0 (0.0%)	
Grade IVa	7 (3.1%)	8 (3.5%)	
Grade IVa disability	1 (0.4%)	0 (0.0%)	
Grade IVb	1 (0.4%)	2 (0.9%)	
Grade IVb disability	0 (0.0%)	2 (0.9%)	
Grade V - Death	4 (1.8%)	8 (3.5%)	
30-Day Patency			0.598
Yes	146 (57.5%)	139 (53.3%)	
No	2 (0.8%)	3 (1.1%)	
Missing	106 (41.7%)	119 (45.6%)	

7.5 Endovascular Repair for Occlusive Disease of the Abdominal Aorta and the Iliac Arteries

Table 11: Endovascular Repair for Aortoiliac Occlusive Disease

	2022 (N=512)	2023 (N=839)	p value
Segment			0.374
Thoracoabdominal Crawford 4	3 (0.6%)	4 (0.5%)	
Aorto-iliac including suprarenal segment	2 (0.4%)	6 (0.7%)	
Aorto-iliac including infrarenal segment	49 (9.6%)	60 (7.2%)	
Isolated iliac arteries	458 (89.5%)	769 (91.7%)	
Pathology			0.185
Dissection without aneurysm formation	26 (5.1%)	27 (3.2%)	
Obstruction intraluminally	50 (9.8%)	62 (7.4%)	
Obstruction wall pathology	427 (83.4%)	734 (87.5%)	
Obstruction by external compression	9 (1.8%)	15 (1.8%)	
Source of emboli w/o pathology of the vessel wall	0 (0.0%)	1 (0.1%)	
Clinical Problem			< 0.001
N-Miss	2	2	
No problem	103 (20.2%)	58 (6.9%)	
Symptomatic	16 (3.1%)	9 (1.1%)	
Bleeding	3 (0.6%)	4 (0.5%)	
Acute Ischemia	57 (11.2%)	96 (11.5%)	
Distal embolisation	4 (0.8%)	2 (0.2%)	
Chronic relative ischemia	219 (42.9%)	482 (57.6%)	
Chronic critical ischemia	108 (21.2%)	186 (22.2%)	
Vascular Intervention			0.001
N-Miss	1	0	
Vascular graft	35 (6.8%)	16 (1.9%)	
Bifurcated graft	15 (2.9%)	17 (2.0%)	
Complex bifurcated graft (Y + branches)	2 (0.4%)	3 (0.4%)	
Repair of vessel wall	1 (0.2%)	1 (0.1%)	
Isolated dilatation (PTA/Stent)	445 (87.1%)	773 (92.1%)	
Mural desobliteration w/wo patch	3 (0.6%)	2 (0.2%)	
Luminal desobliteration (e.g. embolectomy)	6 (1.2%)	14 (1.7%)	
Sealing	2 (0.4%)	2 (0.2%)	
Therapeutic occlusion of vessels	0 (0.0%)	1 (0.1%)	
Imaging	2 (0.4%)	10 (1.2%)	
Sterility			0.274
N-Miss	1	2	
Infected or presumably infected	5 (1.0%)	4 (0.5%)	
Sterile operation	506 (99.0%)	833 (99.5%)	
Previous Interventions			0.334
N-Miss	1	3	
No previous intervention at the same location	432 (84.5%)	678 (81.1%)	
Planned consecutive intervention	9 (1.8%)	20 (2.4%)	
Revision within 30d - inhouse complications	16 (3.1%)	21 (2.5%)	
Revision within 30d - extern complications	2 (0.4%)	3 (0.4%)	
Redo	52 (10.2%)	114 (13.6%)	
Conversion			0.036
N-Miss	5	27	
No Conversion	489 (96.4%)	798 (98.3%)	
Conversion	18 (3.6%)	14 (1.7%)	

	2022 (N=512)	2023 (N=839)	p value
Sex			0.034
N-Miss	1	2	
Male	363 (71.0%)	548 (65.5%)	
Female	148 (29.0%)	289 (34.5%)	
Age (years)			0.188
N-Miss	2	0	
Mean (SD)	70.1 (9.5)	69.3 (10.6)	
Range	40.0 - 97.0	19.0 - 96.0	
Complication			0.015
N-Miss	142	140	
No	244 (65.9%)	511 (73.1%)	
Yes	126 (34.1%)	188 (26.9%)	
ClavienDindo			0.413
N-Miss	142	140	
Grade 0 - No Complication	244 (65.9%)	511 (73.1%)	
Grade I	13 (3.5%)	24 (3.4%)	
Grade I disability	2 (0.5%)	3 (0.4%)	
Grade II	33 (8.9%)	54 (7.7%)	
Grade II disability	4 (1.1%)	7 (1.0%)	
Grade IIIa	6 (1.6%)	11 (1.6%)	
Grade IIIb	41 (11.1%)	58 (8.3%)	
Grade IIIb disability	3 (0.8%)	2 (0.3%)	
Grade IVa	9 (2.4%)	6 (0.9%)	
Grade IVa disability	3 (0.8%)	3 (0.4%)	
Grade IVb disability	0 (0.0%)	1 (0.1%)	
Grade V - Death	12 (3.2%)	19 (2.7%)	
30-Day Patency			0.027
Yes	211 (41.2%)	384 (45.8%)	
No	7 (1.4%)	25 (3.0%)	
Missing	294 (57.4%)	430 (51.3%)	

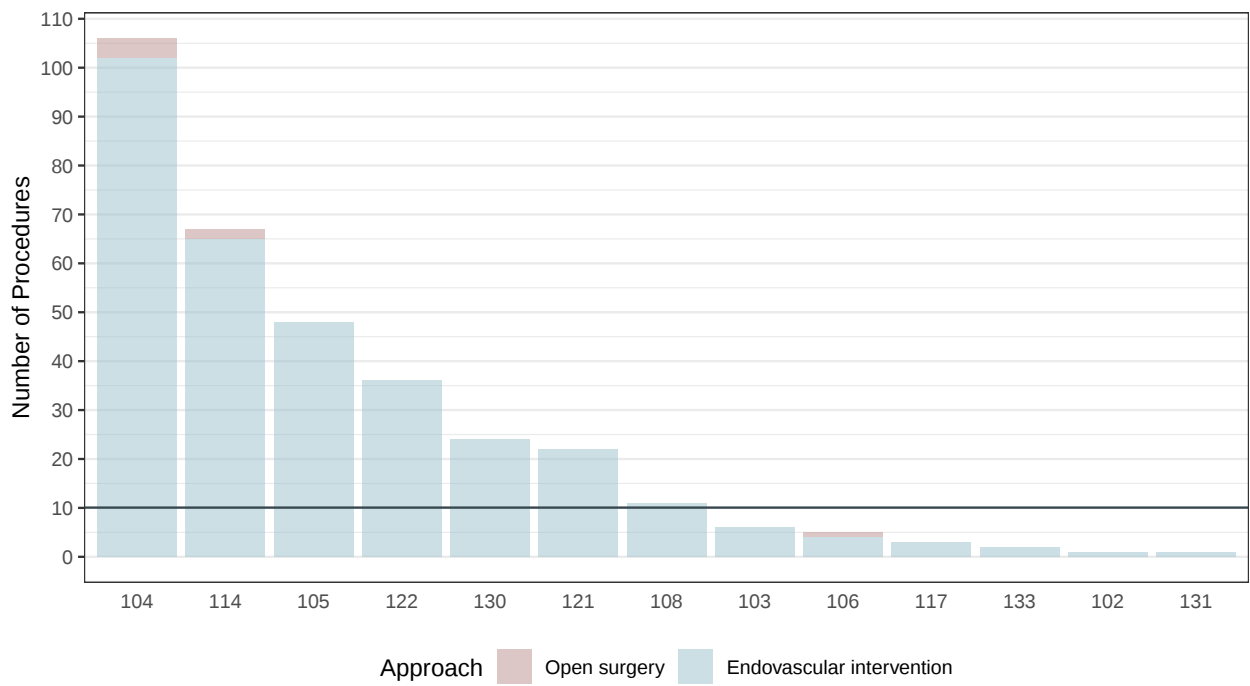
8 Surgery of the Thoracic Aorta

Table 12: Surgery of the Thoracic Aorta

	2022 (N=212)	2023 (N=332)	p value
Segment			0.699
Thoracoabdominal Crawford 1	20 (9.4%)	37 (11.1%)	
Thoracoabdominal Crawford 2	29 (13.7%)	35 (10.5%)	
Thoracoabdominal Crawford 3	14 (6.6%)	17 (5.1%)	
Ascending aorta including aortic arch	4 (1.9%)	11 (3.3%)	
Aortic arch and descendens	29 (13.7%)	49 (14.8%)	
Descending aorta	116 (54.7%)	183 (55.1%)	
Approach			0.002
Open surgery	16 (7.5%)	7 (2.1%)	
Endovascular intervention	196 (92.5%)	325 (97.9%)	
Pathology			0.339
N-Miss	0	1	
No vascular pathology	1 (0.5%)	3 (0.9%)	
Vascular wall injury / pseudoaneurysm	30 (14.2%)	40 (12.1%)	
Aneurysm (true)	79 (37.3%)	124 (37.5%)	
Dissection without aneurysm formation	45 (21.2%)	48 (14.5%)	
Dissection with aneurysm formation	45 (21.2%)	89 (26.9%)	
Obstruction intraluminally	1 (0.5%)	0 (0.0%)	
Obstruction wall pathology	1 (0.5%)	1 (0.3%)	
Obstruction by external compression	0 (0.0%)	1 (0.3%)	
AV-malformation	0 (0.0%)	1 (0.3%)	
Deep venous insufficiency	1 (0.5%)	0 (0.0%)	
Source of emboli w/o pathology of the vessel wall	0 (0.0%)	2 (0.6%)	
Tumor	1 (0.5%)	5 (1.5%)	
Endoleak	8 (3.8%)	17 (5.1%)	
Clinical Problem			0.240
N-Miss	0	1	
No problem	133 (62.7%)	239 (72.2%)	
Symptomatic	48 (22.6%)	58 (17.5%)	
Bleeding	23 (10.8%)	27 (8.2%)	
Local swelling, inflammation or displacement	4 (1.9%)	4 (1.2%)	
Acute Ischemia	3 (1.4%)	2 (0.6%)	
Chronic relative ischemia	0 (0.0%)	1 (0.3%)	
Chronic critical ischemia	1 (0.5%)	0 (0.0%)	
Vascular Intervention			0.464
Vascular graft	159 (75.0%)	247 (74.4%)	
Bifurcated graft	6 (2.8%)	16 (4.8%)	
Complex bifurcated graft (Y + branches)	32 (15.1%)	52 (15.7%)	
Repair of vessel wall	3 (1.4%)	4 (1.2%)	
Isolated dilatation (PTA/Stent)	1 (0.5%)	5 (1.5%)	
Sealing	9 (4.2%)	6 (1.8%)	
Therapeutic occlusion of vessels	1 (0.5%)	1 (0.3%)	
De-/rebranching	0 (0.0%)	1 (0.3%)	
Imaging	1 (0.5%)	0 (0.0%)	
Sterility			0.035
Infected or presumably infected	6 (2.8%)	2 (0.6%)	
Sterile operation	206 (97.2%)	330 (99.4%)	
Sex			0.266

	2022 (N=212)	2023 (N=332)	p value
N-Miss	2	1	
Male	133 (63.3%)	225 (68.0%)	
Female	77 (36.7%)	106 (32.0%)	
Age (years)			0.056
Mean (SD)	71.1 (9.4)	69.3 (11.7)	
Range	31.0 - 91.0	17.0 - 94.0	
Complication			0.118
N-Miss	9	7	
No	92 (45.3%)	170 (52.3%)	
Yes	111 (54.7%)	155 (47.7%)	
ClavienDindo			0.103
N-Miss	9	7	
Grade 0 - No Complication	92 (45.3%)	170 (52.3%)	
Grade I	14 (6.9%)	31 (9.5%)	
Grade I disability	3 (1.5%)	1 (0.3%)	
Grade II	35 (17.2%)	50 (15.4%)	
Grade II disability	5 (2.5%)	15 (4.6%)	
Grade IIIa	5 (2.5%)	6 (1.8%)	
Grade IIIb	27 (13.3%)	25 (7.7%)	
Grade IIIb disability	5 (2.5%)	1 (0.3%)	
Grade IVa	5 (2.5%)	9 (2.8%)	
Grade IVa disability	1 (0.5%)	2 (0.6%)	
Grade IVb	0 (0.0%)	2 (0.6%)	
Grade IVb disability	0 (0.0%)	1 (0.3%)	
Grade V - Death	11 (5.4%)	12 (3.7%)	
30-Day Patency			0.494
Yes	145 (68.4%)	213 (64.2%)	
No	3 (1.4%)	8 (2.4%)	
Missing	64 (30.2%)	111 (33.4%)	

8.1 Treatment of the Thoracic Aorta in 2023 - National Overview



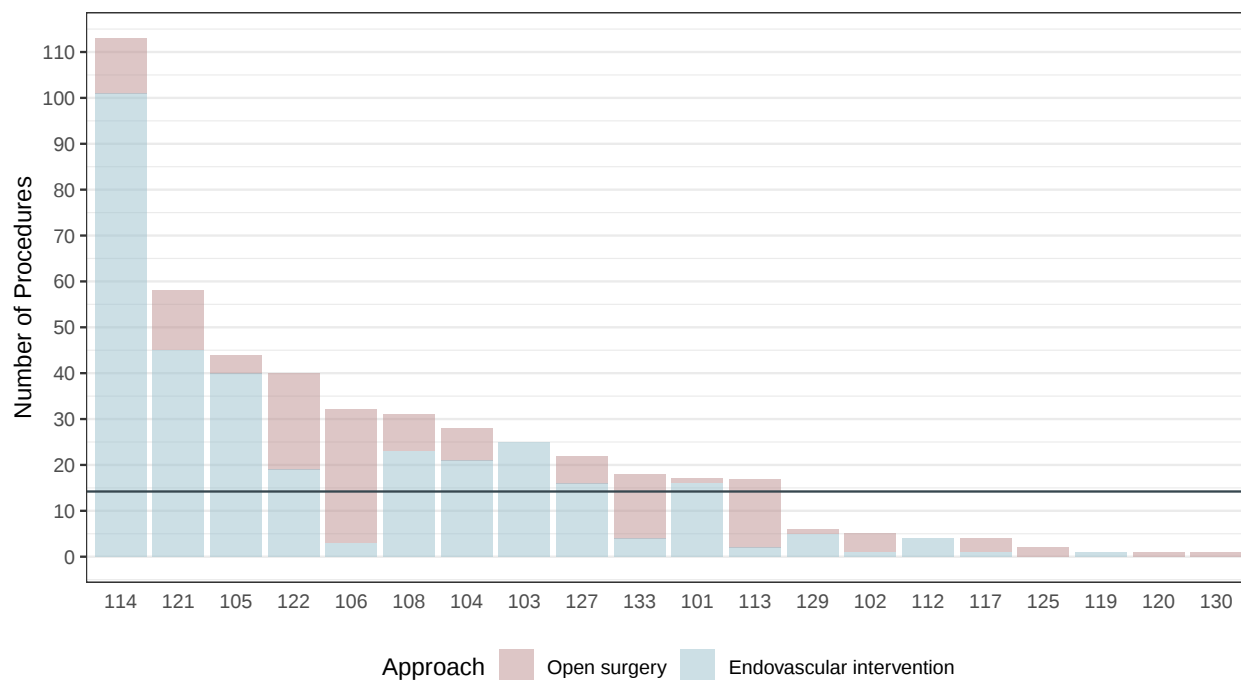
9 Surgery of the Renovisceral Arteries

Table 13: Surgery of the Renovisceral Arteries

	2022 (N=414)	2023 (N=469)	p value
Segment			0.863
Renal arteries	168 (40.6%)	193 (41.2%)	
Visceral arteries	246 (59.4%)	276 (58.8%)	
Approach			0.002
Open surgery	167 (40.3%)	142 (30.3%)	
Endovascular intervention	247 (59.7%)	327 (69.7%)	
Pathology			< 0.001
N-Miss	0	2	
No vascular pathology	270 (65.2%)	230 (49.3%)	
Vascular wall injury / pseudoaneurysm	9 (2.2%)	19 (4.1%)	
Aneurysm (true)	21 (5.1%)	36 (7.7%)	
Inflammatory aneurysm (sterile)	0 (0.0%)	1 (0.2%)	
Dissection without aneurysm formation	12 (2.9%)	12 (2.6%)	
Dissection with aneurysm formation	9 (2.2%)	1 (0.2%)	
Obstruction intraluminally	18 (4.3%)	50 (10.7%)	
Obstruction wall pathology	35 (8.5%)	89 (19.1%)	
Obstruction by external compression	7 (1.7%)	3 (0.6%)	
Tumor	9 (2.2%)	4 (0.9%)	
Endoleak	24 (5.8%)	22 (4.7%)	
Clinical Problem			0.002
N-Miss	0	3	
No problem	332 (80.2%)	338 (72.5%)	
Symptomatic	28 (6.8%)	24 (5.2%)	
Bleeding	11 (2.7%)	23 (4.9%)	
Local swelling, inflammation or displacement	9 (2.2%)	6 (1.3%)	
Acute Ischemia	21 (5.1%)	36 (7.7%)	
Distal embolisation	1 (0.2%)	1 (0.2%)	
Chronic relative ischemia	5 (1.2%)	27 (5.8%)	
Chronic critical ischemia	7 (1.7%)	11 (2.4%)	
Type of Intervention			< 0.001
Isolated main Procedure	94 (22.7%)	135 (28.8%)	
Main Procedure with additional Procedure	31 (7.5%)	61 (13.0%)	
Additional Procedure for Inflow Optimization	8 (1.9%)	7 (1.5%)	
Additional Procedure for Outflow Optimization	40 (9.7%)	20 (4.3%)	
Additional Procedure: De-/rebranching	241 (58.2%)	246 (52.5%)	
Sex			0.049
Male	319 (77.1%)	334 (71.2%)	
Female	95 (22.9%)	135 (28.8%)	
Age (years)			0.970
Mean (SD)	71.3 (10.3)	71.3 (11.4)	
Range	12.0 - 90.0	23.0 - 96.0	
Complication			0.131
N-Miss	35	34	
No	190 (50.1%)	195 (44.8%)	
Yes	189 (49.9%)	240 (55.2%)	
ClavienDindo			0.002
N-Miss	35	34	
Grade 0 - No Complication	190 (50.1%)	195 (44.8%)	

	2022 (N=414)	2023 (N=469)	p value
Grade I	15 (4.0%)	18 (4.1%)	0.520
Grade I disability	9 (2.4%)	1 (0.2%)	
Grade II	64 (16.9%)	92 (21.1%)	
Grade II disability	1 (0.3%)	8 (1.8%)	
Grade IIIa	10 (2.6%)	7 (1.6%)	
Grade IIIa disability	6 (1.6%)	2 (0.5%)	
Grade IIIb	36 (9.5%)	53 (12.2%)	
Grade IIIb disability	8 (2.1%)	3 (0.7%)	
Grade IVa	14 (3.7%)	27 (6.2%)	
Grade IVa disability	5 (1.3%)	1 (0.2%)	
Grade IVb	7 (1.8%)	5 (1.1%)	
Grade IVb disability	0 (0.0%)	2 (0.5%)	
Grade V - Death	14 (3.7%)	21 (4.8%)	
30-Day Patency			
Yes	231 (55.8%)	244 (52.0%)	
No	2 (0.5%)	3 (0.6%)	
Missing	181 (43.7%)	222 (47.3%)	

9.1 Treatment of the Renovisceral Arteries in 2023 - National Overview



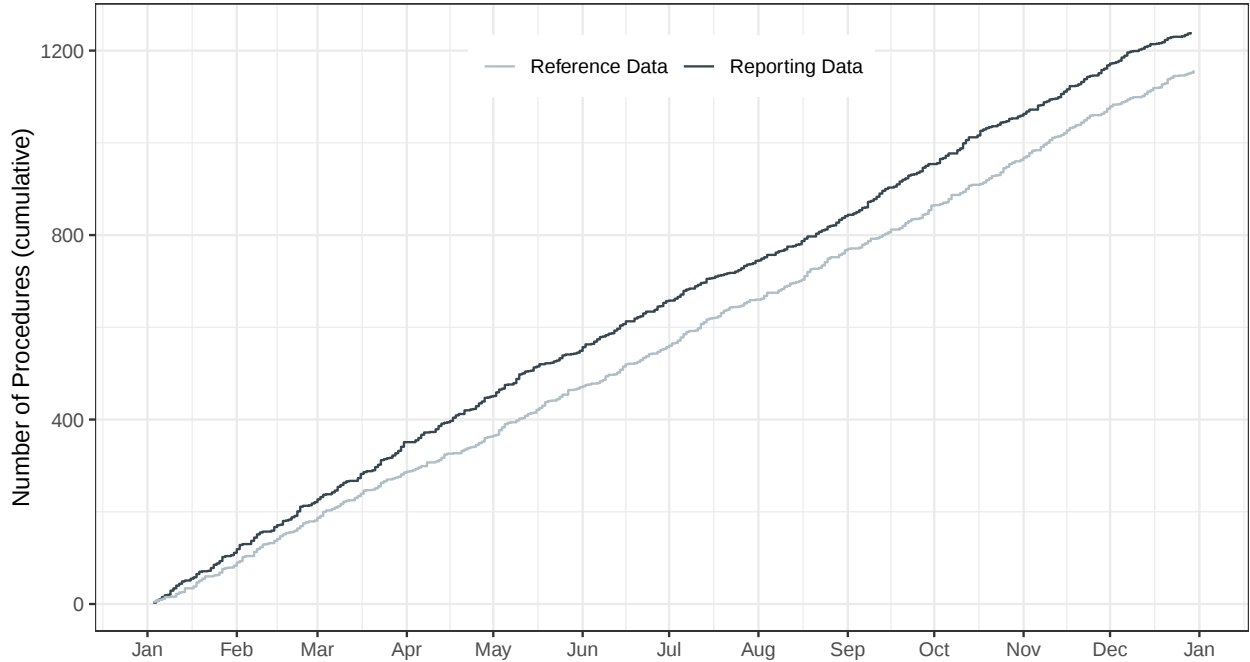
10 Treatment of the Femoral Bifurcation

Table 14: Surgery on femoral bifurcation

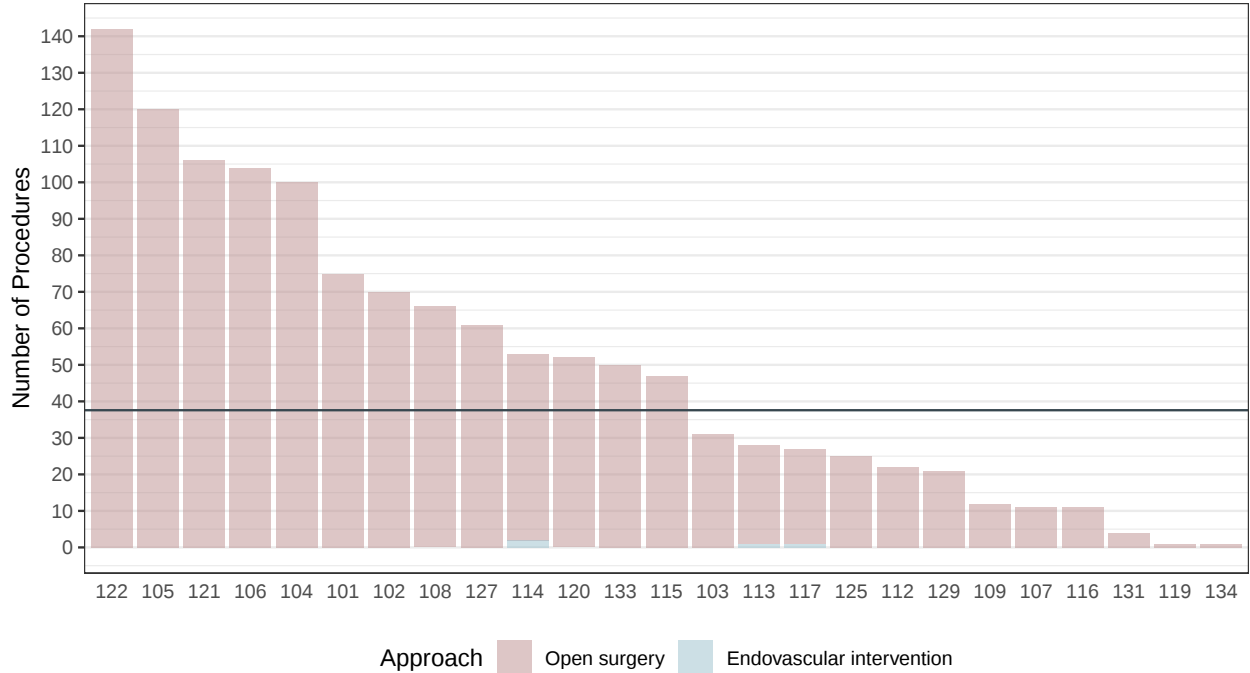
	2022 (N=1394)	2023 (N=1545)	p value
Pathology			0.020
N-Miss	3	26	
No vascular pathology	34 (2.4%)	13 (0.9%)	
Vascular wall injury / pseudoaneurysm	122 (8.8%)	155 (10.2%)	
Aneurysm (true)	42 (3.0%)	44 (2.9%)	
Inflammatory aneurysm (sterile)	1 (0.1%)	0 (0.0%)	
Dissection without aneurysm formation	15 (1.1%)	20 (1.3%)	
Dissection with aneurysm formation	2 (0.1%)	1 (0.1%)	
Obstruction intraluminally	218 (15.7%)	224 (14.7%)	
Obstruction wall pathology	942 (67.7%)	1057 (69.6%)	
Obstruction by external compression	4 (0.3%)	1 (0.1%)	
AV-malformation	8 (0.6%)	4 (0.3%)	
Source of emboli w/o pathology of the vessel wall	1 (0.1%)	0 (0.0%)	
Endoleak	2 (0.1%)	0 (0.0%)	
Vascular Intervention			0.385
N-Miss	0	1	
Vascular graft	144 (10.3%)	156 (10.1%)	
Bifurcated graft	33 (2.4%)	47 (3.0%)	
Complex bifurcated graft (Y + branches)	10 (0.7%)	6 (0.4%)	
Repair of vessel wall	59 (4.2%)	80 (5.2%)	
Isolated dilatation (PTA/Stent)	1 (0.1%)	4 (0.3%)	
Mural desobliteration w/wo patch	1027 (73.7%)	1122 (72.7%)	
Luminal desobliteration (e.g. embolectomy)	97 (7.0%)	114 (7.4%)	
Sealing	9 (0.6%)	2 (0.1%)	
Therapeutic occlusion of vessels	7 (0.5%)	6 (0.4%)	
Resection of av-malform	2 (0.1%)	3 (0.2%)	
De-/rebranching	4 (0.3%)	3 (0.2%)	
Imaging	1 (0.1%)	1 (0.1%)	
Material			0.042
Autologous Material Only	37 (2.7%)	55 (3.6%)	
Biological Material	980 (70.3%)	1089 (70.5%)	
Synthetic Material for Vessel wall	216 (15.5%)	191 (12.4%)	
Coils, Plugs, etc	3 (0.2%)	6 (0.4%)	
No material	158 (11.3%)	204 (13.2%)	
Inflow Optimisation			0.086
N-Miss	419	362	
Same Approach	39 (4.0%)	65 (5.5%)	
Hybrid Approach	140 (14.4%)	195 (16.5%)	
No Inflow Optimization	796 (81.6%)	923 (78.0%)	
Outflow			0.411
N-Miss	420	363	
Same Approach	81 (8.3%)	118 (10.0%)	
Hybrid Approach	73 (7.5%)	88 (7.4%)	
No Outflow Optimization	820 (84.2%)	976 (82.6%)	
Sterility			0.078
N-Miss	10	2	
Infected or presumably infected	46 (3.3%)	71 (4.6%)	
Sterile operation	1338 (96.7%)	1472 (95.4%)	

	2022 (N=1394)	2023 (N=1545)	p value
Sex			0.459
N-Miss	0	3	
Male	932 (66.9%)	1011 (65.6%)	
Female	462 (33.1%)	531 (34.4%)	
Age (years)			0.762
N-Miss	2	0	
Mean (SD)	71.9 (10.8)	72.1 (10.9)	
Range	10.0 - 100.0	0.0 - 99.0	
Complication			0.069
N-Miss	280	221	
No	689 (61.8%)	866 (65.4%)	
Yes	425 (38.2%)	458 (34.6%)	
ClavienDindo			0.001
N-Miss	280	221	
Grade 0 - No Complication	689 (61.8%)	866 (65.4%)	
Grade I	35 (3.1%)	40 (3.0%)	
Grade I disability	11 (1.0%)	5 (0.4%)	
Grade II	99 (8.9%)	124 (9.4%)	
Grade II disability	10 (0.9%)	23 (1.7%)	
Grade IIIa	17 (1.5%)	25 (1.9%)	
Grade IIIa disability	1 (0.1%)	2 (0.2%)	
Grade IIIb	136 (12.2%)	138 (10.4%)	
Grade IIIb disability	25 (2.2%)	8 (0.6%)	
Grade IVa	40 (3.6%)	28 (2.1%)	
Grade IVa disability	4 (0.4%)	1 (0.1%)	
Grade IVb	6 (0.5%)	3 (0.2%)	
Grade IVb disability	0 (0.0%)	2 (0.2%)	
Grade V - Death	41 (3.7%)	59 (4.5%)	
30-Day Patency			0.459
Yes	633 (45.4%)	705 (45.6%)	
No	16 (1.1%)	26 (1.7%)	
Missing	745 (53.4%)	814 (52.7%)	

10.1 Treatment of the Femoral Bifurcation - Year-on-Year Change



10.2 Surgery on Femoral Bifurcation in 2023 - National Overview



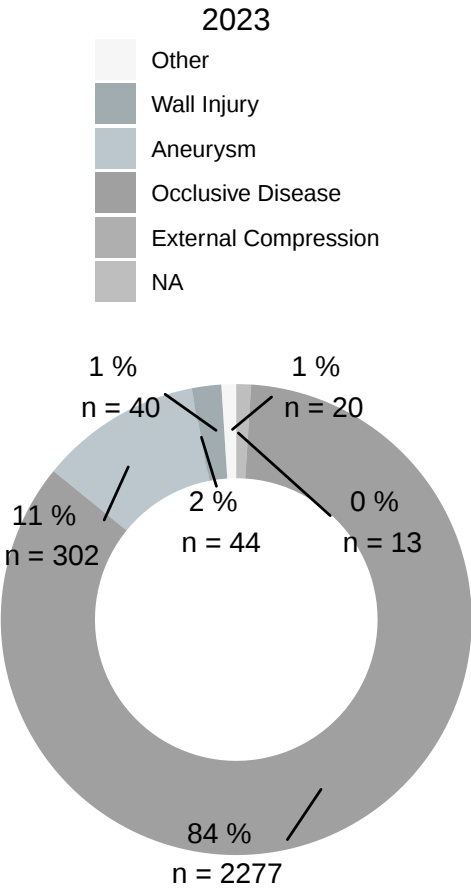
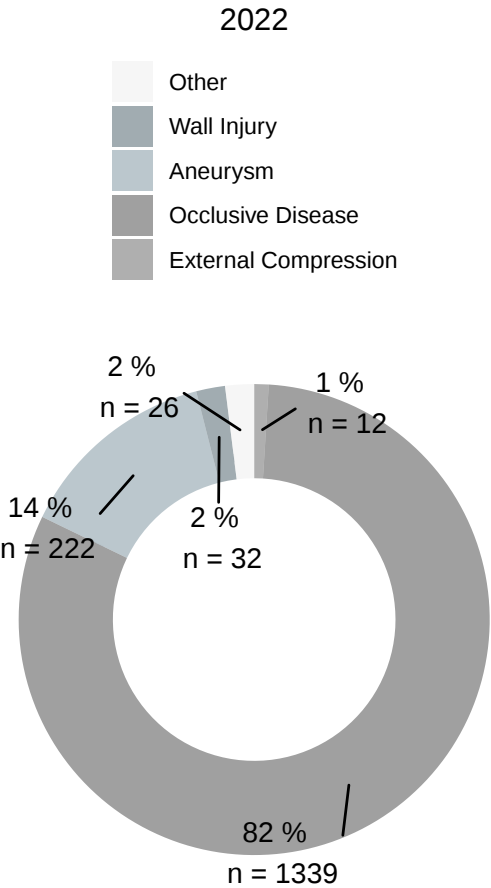
11 Treatment of Arteries of the Lower Extremity

Table 15: Overview - Bypass Surgery of the Lower Extremity

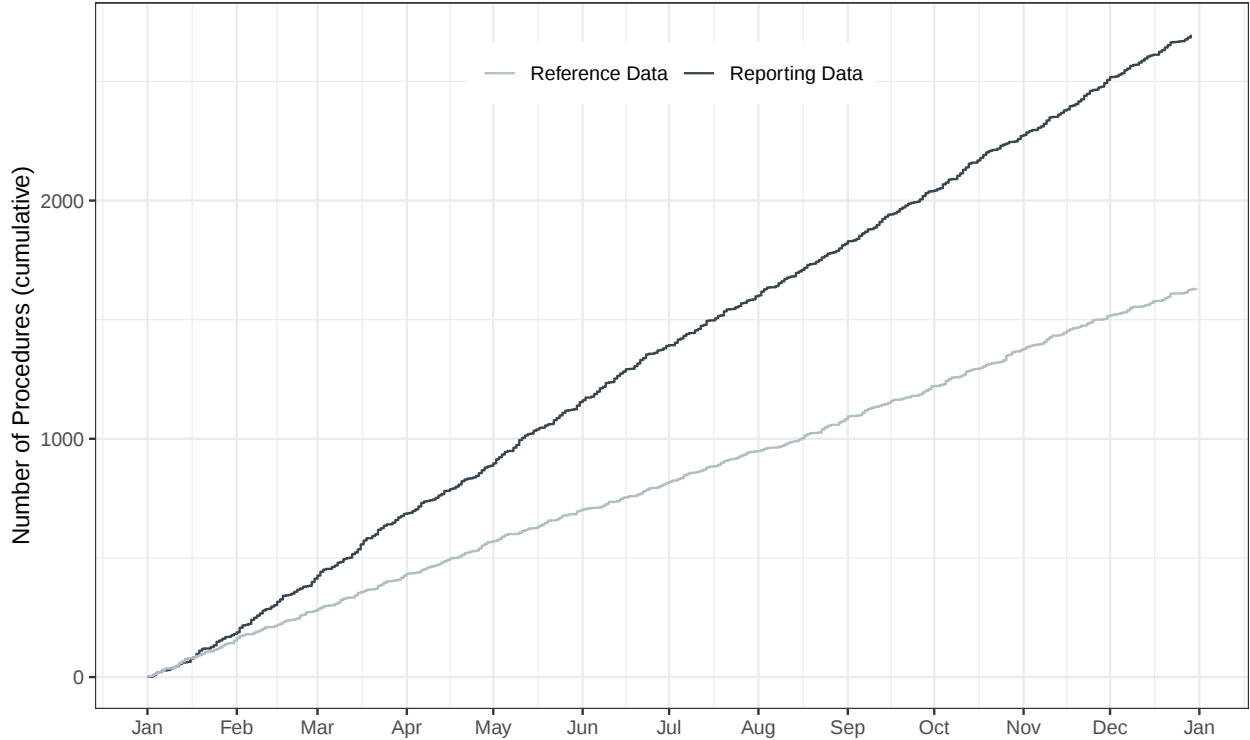
	2022 (N=1631)	2023 (N=2696)	p value
Segment			< 0.001
Femoro-popliteal, supragenicular	471 (28.9%)	968 (35.9%)	
Isolated popliteal	139 (8.5%)	229 (8.5%)	
Femoro-popliteal, infragenicular	402 (24.6%)	550 (20.4%)	
Femoro-cural, infrapopliteal	299 (18.3%)	374 (13.9%)	
Popliteal trifurcation and crural-pedal	320 (19.6%)	575 (21.3%)	
Type of Intervention			0.005
Isolated main Procedure	781 (47.9%)	1229 (45.6%)	
Main Procedure with additional Procedure	561 (34.4%)	1073 (39.8%)	
Additional Procedure for Inflow Optimization	32 (2.0%)	44 (1.6%)	
Additional Procedure for Outflow Optimization	256 (15.7%)	346 (12.8%)	
Additional Procedure: De-/rebranching	0 (0.0%)	2 (0.1%)	
Additional Procedure: Diagnostic	1 (0.1%)	2 (0.1%)	
Approach			< 0.001
Open surgery	1210 (74.2%)	1526 (56.6%)	
Endovascular intervention	421 (25.8%)	1170 (43.4%)	
Material			< 0.001
N-Miss	14	11	
Autologous Material Only	622 (38.5%)	805 (30.0%)	
Biological Material	70 (4.3%)	107 (4.0%)	
Synthetic Material for Vessel wall	249 (15.4%)	414 (15.4%)	
Coils, Plugs, etc	184 (11.4%)	564 (21.0%)	
No material	492 (30.4%)	795 (29.6%)	
Sterility			0.070
N-Miss	9	5	
Infected or presumably infected	38 (2.3%)	89 (3.3%)	
Sterile operation	1584 (97.7%)	2602 (96.7%)	
Sex			0.650
N-Miss	1	3	
Male	1178 (72.3%)	1929 (71.6%)	
Female	452 (27.7%)	764 (28.4%)	
Age (years)			0.036
N-Miss	1	0	
Mean (SD)	72.1 (12.1)	72.9 (11.9)	
Range	19.0 - 99.0	0.0 - 103.0	
Complication			< 0.001
N-Miss	430	371	
No	667 (55.5%)	1580 (68.0%)	
Yes	534 (44.5%)	745 (32.0%)	
ClavienDindo			< 0.001
N-Miss	430	371	
Grade 0 - No Complication	667 (55.5%)	1580 (68.0%)	
Grade I	36 (3.0%)	67 (2.9%)	
Grade I disability	9 (0.7%)	14 (0.6%)	
Grade II	132 (11.0%)	199 (8.6%)	
Grade II disability	20 (1.7%)	27 (1.2%)	
Grade IIIa	26 (2.2%)	38 (1.6%)	
Grade IIIa disability	2 (0.2%)	8 (0.3%)	

	2022 (N=1631)	2023 (N=2696)	p value
Grade IIIb	202 (16.8%)	276 (11.9%)	
Grade IIIb disability	30 (2.5%)	20 (0.9%)	
Grade IVa	40 (3.3%)	26 (1.1%)	
Grade IVa disability	3 (0.2%)	3 (0.1%)	
Grade IVb	13 (1.1%)	8 (0.3%)	
Grade IVb disability	1 (0.1%)	0 (0.0%)	
Grade V - Death	20 (1.7%)	59 (2.5%)	
30-Day Patency			0.604
Yes	762 (46.7%)	1302 (48.3%)	
No	48 (2.9%)	77 (2.9%)	
Missing	821 (50.3%)	1317 (48.9%)	

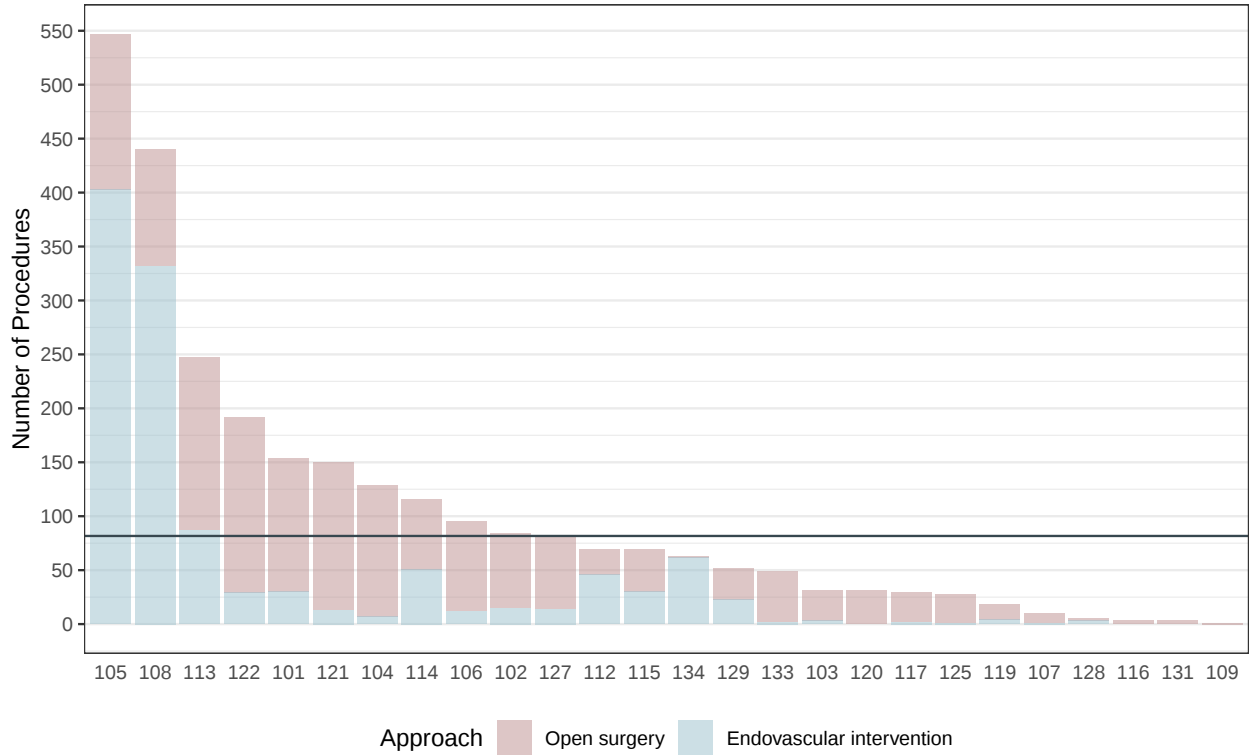
11.0.1 Treated Pathologies at the Lower Extremities (excluding Femoral Bifurcation)



11.0.2 Treatment of Arteries of the Lower Extremity - Year-on-Year Change



11.0.3 Surgery Arteries of the Lower Extremity in 2023 - National Overview



11.1 Surgery on the supragenicular femoro-popliteal Arteries

Table 16: Surgery on the supragenicular femoro-popliteal Arteries

	2022 (N=471)	2023 (N=968)	p value
Pathology			< 0.001
N-Miss	0	13	
No vascular pathology	3 (0.6%)	8 (0.8%)	
Vascular wall injury / pseudoaneurysm	12 (2.5%)	13 (1.4%)	
Aneurysm (true)	32 (6.8%)	33 (3.5%)	
Inflammatory aneurysm (sterile)	0 (0.0%)	1 (0.1%)	
Dissection without aneurysm formation	2 (0.4%)	3 (0.3%)	
Dissection with aneurysm formation	1 (0.2%)	0 (0.0%)	
Obstruction intraluminally	96 (20.4%)	127 (13.3%)	
Obstruction wall pathology	320 (67.9%)	766 (80.2%)	
Obstruction by external compression	1 (0.2%)	1 (0.1%)	
AV-malformation	4 (0.8%)	2 (0.2%)	
Tumor	0 (0.0%)	1 (0.1%)	
Vascular Intervention			< 0.001
N-Miss	0	1	
Vascular graft	153 (32.5%)	224 (23.2%)	
Bifurcated graft	0 (0.0%)	2 (0.2%)	
Complex bifurcated graft (Y + branches)	1 (0.2%)	0 (0.0%)	
Repair of vessel wall	2 (0.4%)	3 (0.3%)	
Isolated dilatation (PTA/Stent)	230 (48.8%)	628 (64.9%)	
Mural desobliteration w/wo patch	20 (4.2%)	12 (1.2%)	
Luminal desobliteration (e.g. embolectomy)	55 (11.7%)	79 (8.2%)	
Extramural deblockage	1 (0.2%)	0 (0.0%)	
Sealing	1 (0.2%)	1 (0.1%)	
Therapeutic occlusion of vessels	1 (0.2%)	1 (0.1%)	
Resection of av-malform	1 (0.2%)	6 (0.6%)	
De-/rebranching	3 (0.6%)	2 (0.2%)	
Imaging	3 (0.6%)	9 (0.9%)	
Material			< 0.001
N-Miss	3	3	
Autologous Material Only	83 (17.7%)	135 (14.0%)	
Biological Material	21 (4.5%)	23 (2.4%)	
Synthetic Material for Vessel wall	102 (21.8%)	190 (19.7%)	
Coils, Plugs, etc	118 (25.2%)	373 (38.7%)	
No material	144 (30.8%)	244 (25.3%)	
Inflow Optimisation			0.398
N-Miss	110	146	
Same Approach	29 (8.0%)	49 (6.0%)	
Hybrid Approach	6 (1.7%)	12 (1.5%)	
No Inflow Optimization	326 (90.3%)	761 (92.6%)	
Outflow			0.153
N-Miss	111	146	
Same Approach	17 (4.7%)	24 (2.9%)	
Hybrid Approach	8 (2.2%)	11 (1.3%)	
No Outflow Optimization	335 (93.1%)	787 (95.7%)	
Sterility			0.532
N-Miss	1	0	
Infected or presumably infected	14 (3.0%)	35 (3.6%)	
Sterile operation	456 (97.0%)	933 (96.4%)	

	2022 (N=471)	2023 (N=968)	p value
Sex			0.996
N-Miss	1	0	
Male	317 (67.4%)	653 (67.5%)	
Female	153 (32.6%)	315 (32.5%)	
Age (years)			0.523
Mean (SD)	72.6 (11.5)	73.0 (11.1)	
Range	30.0 - 96.0	0.0 - 99.0	
Complication			< 0.001
N-Miss	191	171	
No	177 (63.2%)	615 (77.2%)	
Yes	103 (36.8%)	182 (22.8%)	
ClavienDindo			< 0.001
N-Miss	191	171	
Grade 0 - No Complication	177 (63.2%)	615 (77.2%)	
Grade I	12 (4.3%)	20 (2.5%)	
Grade I disability	0 (0.0%)	2 (0.3%)	
Grade II	28 (10.0%)	66 (8.3%)	
Grade II disability	3 (1.1%)	7 (0.9%)	
Grade IIIa	4 (1.4%)	12 (1.5%)	
Grade IIIa disability	0 (0.0%)	2 (0.3%)	
Grade IIIb	36 (12.9%)	54 (6.8%)	
Grade IIIb disability	1 (0.4%)	1 (0.1%)	
Grade IVa	9 (3.2%)	7 (0.9%)	
Grade IVa disability	1 (0.4%)	1 (0.1%)	
Grade IVb	1 (0.4%)	0 (0.0%)	
Grade V - Death	8 (2.9%)	10 (1.3%)	
30-Day Patency			0.014
Yes	166 (35.2%)	419 (43.3%)	
No	10 (2.1%)	19 (2.0%)	
Missing	295 (62.6%)	530 (54.8%)	

11.2 Surgery on the popliteal Artery

Table 17: Surgery on the popliteal Artery

	2022 (N=139)	2023 (N=229)	p value
Pathology			0.034
Vascular wall injury / pseudoaneurysm	10 (7.2%)	7 (3.1%)	
Aneurysm (true)	94 (67.6%)	156 (68.1%)	
Dissection without aneurysm formation	0 (0.0%)	4 (1.7%)	
Obstruction intraluminally	13 (9.4%)	18 (7.9%)	
Obstruction wall pathology	13 (9.4%)	39 (17.0%)	
Obstruction by external compression	7 (5.0%)	4 (1.7%)	
AV-malformation	2 (1.4%)	1 (0.4%)	
Vascular Intervention			0.013
Vascular graft	105 (75.5%)	173 (75.5%)	
Bifurcated graft	1 (0.7%)	0 (0.0%)	
Repair of vessel wall	0 (0.0%)	3 (1.3%)	
Isolated dilatation (PTA/Stent)	10 (7.2%)	38 (16.6%)	
Mural desobliteration w/wo patch	3 (2.2%)	2 (0.9%)	
Luminal desobliteration (e.g. embolectomy)	11 (7.9%)	7 (3.1%)	
Extramural deblockage	6 (4.3%)	2 (0.9%)	
Sealing	1 (0.7%)	1 (0.4%)	
Therapeutic occlusion of vessels	0 (0.0%)	2 (0.9%)	
Resection of av-malform	1 (0.7%)	1 (0.4%)	
Imaging	1 (0.7%)	0 (0.0%)	
Material			0.008
N-Miss	0	1	
Autologous Material Only	93 (66.9%)	129 (56.6%)	
Biological Material	7 (5.0%)	8 (3.5%)	
Synthetic Material for Vessel wall	11 (7.9%)	41 (18.0%)	
Coils, Plugs, etc	2 (1.4%)	15 (6.6%)	
No material	26 (18.7%)	35 (15.4%)	
Inflow			0.485
N-Miss	78	89	
Same Approach	2 (3.3%)	8 (5.7%)	
Hybrid Approach	0 (0.0%)	2 (1.4%)	
No Inflow Optimization	59 (96.7%)	130 (92.9%)	
Outflow			0.142
N-Miss	78	89	
Same Approach	8 (13.1%)	10 (7.1%)	
Hybrid Approach	0 (0.0%)	5 (3.6%)	
No Outflow Optimization	53 (86.9%)	125 (89.3%)	
Sterility			0.821
Infected or presumably infected	2 (1.4%)	4 (1.7%)	
Sterile operation	137 (98.6%)	225 (98.3%)	
Sex			0.591
Male	124 (89.2%)	200 (87.3%)	
Female	15 (10.8%)	29 (12.7%)	
Age (years)			0.046
Mean (SD)	68.8 (14.3)	71.5 (11.4)	
Range	19.0 - 95.0	18.0 - 95.0	
Complication			0.601
N-Miss	28	12	
No	82 (73.9%)	166 (76.5%)	

	2022 (N=139)	2023 (N=229)	p value
Yes	29 (26.1%)	51 (23.5%)	0.112
ClavienDindo			
N-Miss	28	12	
Grade 0 - No Complication	82 (73.9%)	166 (76.5%)	
Grade I	4 (3.6%)	13 (6.0%)	
Grade I disability	4 (3.6%)	3 (1.4%)	
Grade II	2 (1.8%)	10 (4.6%)	
Grade II disability	2 (1.8%)	2 (0.9%)	
Grade IIIa	2 (1.8%)	2 (0.9%)	
Grade IIIa disability	0 (0.0%)	2 (0.9%)	
Grade IIIb	7 (6.3%)	14 (6.5%)	
Grade IIIb disability	4 (3.6%)	0 (0.0%)	
Grade IVa	3 (2.7%)	2 (0.9%)	
Grade V - Death	1 (0.9%)	3 (1.4%)	
30-Day Patency			0.810
Yes	84 (60.4%)	142 (62.0%)	
No	1 (0.7%)	3 (1.3%)	
Missing	54 (38.8%)	84 (36.7%)	

11.3 Surgery on the infragenicular and crural Arteries

Table 18: Surgery on the infragenicular and crural Arteries

	2022 (N=1021)	2023 (N=1499)	p value
Segment			< 0.001
Femoro-popliteal, infragenicular	402 (39.4%)	550 (36.7%)	
Femoro-crural, infrapopliteal	299 (29.3%)	374 (24.9%)	
Popliteal trifurcation and crural-pedal	320 (31.3%)	575 (38.4%)	
Pathology			0.006
N-Miss	0	7	
No vascular pathology	7 (0.7%)	4 (0.3%)	
Vascular wall injury / pseudoaneurysm	10 (1.0%)	24 (1.6%)	
Aneurysm (true)	94 (9.2%)	111 (7.4%)	
Inflammatory aneurysm (sterile)	1 (0.1%)	1 (0.1%)	
Dissection without aneurysm formation	5 (0.5%)	2 (0.1%)	
Obstruction intraluminally	411 (40.3%)	523 (35.1%)	
Obstruction wall pathology	486 (47.6%)	804 (53.9%)	
Obstruction by external compression	4 (0.4%)	8 (0.5%)	
AV-malformation	2 (0.2%)	10 (0.7%)	
No vascular pathology / vascular access or diagnostic procedures)	0 (0.0%)	1 (0.1%)	
Source of emboli w/o pathology of the vessel wall	0 (0.0%)	4 (0.3%)	
Tumor	1 (0.1%)	0 (0.0%)	
Vascular Intervention			< 0.001
Vascular graft	549 (53.8%)	683 (45.6%)	
Bifurcated graft	3 (0.3%)	6 (0.4%)	
Complex bifurcated graft (Y + branches)	5 (0.5%)	3 (0.2%)	
Repair of vessel wall	2 (0.2%)	10 (0.7%)	
Isolated dilatation (PTA/Stent)	139 (13.6%)	425 (28.4%)	
Mural desobliteration w/wo patch	50 (4.9%)	49 (3.3%)	
Luminal desobliteration (e.g. embolectomy)	263 (25.8%)	312 (20.8%)	
Extramural deblockage	3 (0.3%)	1 (0.1%)	
Therapeutic occlusion of vessels	1 (0.1%)	2 (0.1%)	
Resection of av-malform	2 (0.2%)	2 (0.1%)	
Creation of a therapeutic AV-fistula	0 (0.0%)	1 (0.1%)	
De-/rebranching	0 (0.0%)	1 (0.1%)	
Imaging	4 (0.4%)	4 (0.3%)	
Material			< 0.001
N-Miss	11	7	
Autologous Material Only	446 (44.2%)	541 (36.3%)	
Biological Material	42 (4.2%)	76 (5.1%)	
Synthetic Material for Vessel wall	136 (13.5%)	183 (12.3%)	
Coils, Plugs, etc	64 (6.3%)	176 (11.8%)	
No material	322 (31.9%)	516 (34.6%)	
Inflow Optimisation			0.130
N-Miss	298	342	
Same Approach	98 (13.6%)	122 (10.5%)	
Hybrid Approach	14 (1.9%)	20 (1.7%)	
No Inflow Optimization	611 (84.5%)	1015 (87.7%)	

	2022 (N=1021)	2023 (N=1499)	p value
Outflow			0.043
N-Miss	299	342	
Same Approach	68 (9.4%)	106 (9.2%)	
Hybrid Approach	44 (6.1%)	42 (3.6%)	
No Outflow Optimization	610 (84.5%)	1009 (87.2%)	
Sterility			0.084
N-Miss	8	5	
Infected or presumably infected	22 (2.2%)	50 (3.3%)	
Sterile operation	991 (97.8%)	1444 (96.7%)	
Sex			0.887
N-Miss	0	3	
Male	737 (72.2%)	1076 (71.9%)	
Female	284 (27.8%)	420 (28.1%)	
Age (years)			0.157
N-Miss	1	0	
Mean (SD)	72.3 (12.0)	73.0 (12.4)	
Range	19.0 - 99.0	0.0 - 103.0	
Complication			< 0.001
N-Miss	211	188	
No	408 (50.4%)	799 (60.9%)	
Yes	402 (49.6%)	512 (39.1%)	
ClavienDindo			< 0.001
N-Miss	211	188	
Grade 0 - No Complication	408 (50.4%)	799 (60.9%)	
Grade I	20 (2.5%)	34 (2.6%)	
Grade I disability	5 (0.6%)	9 (0.7%)	
Grade II	102 (12.6%)	123 (9.4%)	
Grade II disability	15 (1.9%)	18 (1.4%)	
Grade IIIa	20 (2.5%)	24 (1.8%)	
Grade IIIa disability	2 (0.2%)	4 (0.3%)	
Grade IIIb	159 (19.6%)	208 (15.9%)	
Grade IIIb disability	25 (3.1%)	19 (1.4%)	
Grade IVa	28 (3.5%)	17 (1.3%)	
Grade IVa disability	2 (0.2%)	2 (0.2%)	
Grade IVb	12 (1.5%)	8 (0.6%)	
Grade IVb disability	1 (0.1%)	0 (0.0%)	
Grade V - Death	11 (1.4%)	46 (3.5%)	
30-Day Patency			0.940
Yes	512 (50.1%)	741 (49.4%)	
No	37 (3.6%)	55 (3.7%)	
Missing	472 (46.2%)	703 (46.9%)	

12 Access Surgery

Table 19: Dialysis Access Surgery

	2022 (N=1174)	2023 (N=1431)	p value
SGG OP Code			< 0.001
N-Miss	1	0	
Abolition of AV-Shunt	49 (4.2%)	65 (4.5%)	
Amputation of toe	1 (0.1%)	0 (0.0%)	
Angiography	6 (0.5%)	12 (0.8%)	
Brachio-cephalic fistula	238 (20.3%)	240 (16.8%)	
Cimino-Brescia fistula	146 (12.4%)	206 (14.4%)	
Dialysis fistula other location	22 (1.9%)	42 (2.9%)	
Intervention in brachial arteries	12 (1.0%)	116 (8.1%)	
Other AV-Shunt (others)	123 (10.5%)	144 (10.1%)	
Other vascular access (incl. Catheter)	8 (0.7%)	0 (0.0%)	
Revasc for acute arterial occlusion	1 (0.1%)	1 (0.1%)	
Septic vascular surgery	1 (0.1%)	0 (0.0%)	
Surgery on angiodysplasia	0 (0.0%)	1 (0.1%)	
Surgery on occlusion of upper extremity	0 (0.0%)	4 (0.3%)	
Tabatiere fistula	15 (1.3%)	27 (1.9%)	
Temporary av-fistula (venous thrombectomy)	0 (0.0%)	1 (0.1%)	
Thrombectomy AV-Shunt	63 (5.4%)	75 (5.2%)	
Venous dialysis catheter	487 (41.5%)	497 (34.7%)	
Venous transposition	1 (0.1%)	0 (0.0%)	
Complication			0.691
N-Miss	672	521	
No	449 (89.4%)	820 (90.1%)	
Yes	53 (10.6%)	90 (9.9%)	
ClavienDindo			0.028
N-Miss	672	521	
Grade 0 - No Complication	449 (89.4%)	820 (90.1%)	
Grade I	8 (1.6%)	8 (0.9%)	
Grade I disability	3 (0.6%)	4 (0.4%)	
Grade II	5 (1.0%)	13 (1.4%)	
Grade IIIa	10 (2.0%)	7 (0.8%)	
Grade IIIb	13 (2.6%)	49 (5.4%)	
Grade IIIb disability	2 (0.4%)	1 (0.1%)	
Grade IVa	3 (0.6%)	3 (0.3%)	
Grade IVa disability	2 (0.4%)	0 (0.0%)	
Grade IVb disability	1 (0.2%)	1 (0.1%)	
Grade V - Death	6 (1.2%)	4 (0.4%)	
30-Day Patency			< 0.001
Yes	40 (3.4%)	129 (9.0%)	
No	4 (0.3%)	19 (1.3%)	
Missing	1130 (96.3%)	1283 (89.7%)	

12.1 Catheters versus AV-Fistula/Shunts

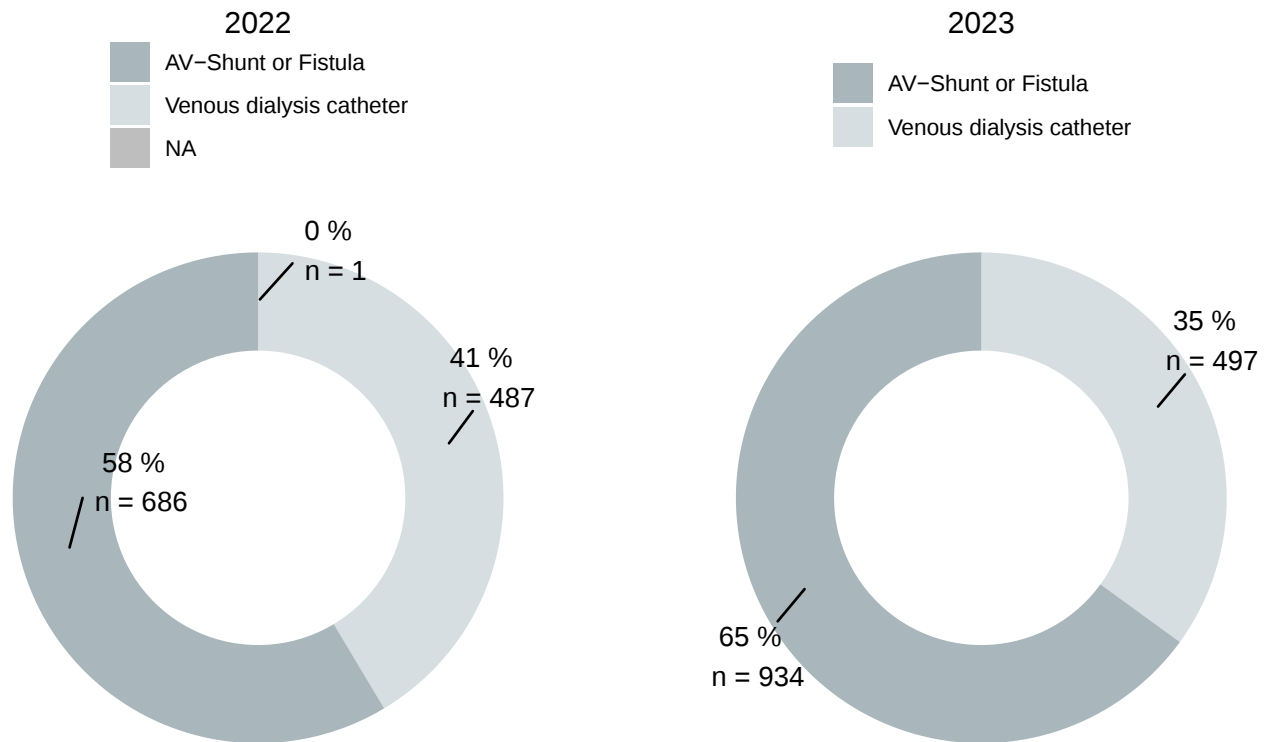


Table 20: AV-Fistula or AV-Shunt

	2022 (N=686)	2023 (N=934)
Vascular Intervention		
N-Miss	13	5
Vascular graft	52 (7.7%)	71 (7.6%)
Repair of vessel wall	26 (3.9%)	21 (2.3%)
Isolated dilatation (PTA/Stent)	28 (4.2%)	137 (14.7%)
Mural desobliteration w/wo patch	15 (2.2%)	9 (1.0%)
Luminal desobliteration (e.g. embolectomy)	69 (10.3%)	99 (10.7%)
Extramural deblockage	0 (0.0%)	3 (0.3%)
Sealing	1 (0.1%)	1 (0.1%)
Therapeutic occlusion of vessels	51 (7.6%)	64 (6.9%)
Resection of av-malform	11 (1.6%)	9 (1.0%)
Creation of a therapeutic AV-fistula	404 (60.0%)	496 (53.4%)
De-/rebranching	8 (1.2%)	12 (1.3%)
Imaging	8 (1.2%)	7 (0.8%)
Segment		
N-Miss	4	0
Brachial artery	17 (2.5%)	22 (2.4%)
Cubita and forearm	21 (3.1%)	9 (1.0%)
Arteries of wrist	6 (0.9%)	18 (1.9%)
Subclavian vein axillary vein	0 (0.0%)	1 (0.1%)
Arm veins	5 (0.7%)	3 (0.3%)
Forearm	257 (37.7%)	279 (29.9%)
Wrist	43 (6.3%)	96 (10.3%)
Cubital forearm	240 (35.2%)	248 (26.6%)
Upper arm	92 (13.5%)	251 (26.9%)
Leg	1 (0.1%)	7 (0.7%)
Material		
N-Miss	24	7
Autologous Material Only	255 (38.5%)	294 (31.7%)
Biological Material	28 (4.2%)	33 (3.6%)
Synthetic Material for Vessel wall	98 (14.8%)	154 (16.6%)
Coils, Plugs, etc	5 (0.8%)	27 (2.9%)
No material	276 (41.7%)	419 (45.2%)
Pathology		
N-Miss	10	17
No vascular pathology	514 (76.0%)	569 (62.1%)
Vascular wall injury / pseudoaneurysm	20 (3.0%)	18 (2.0%)
Aneurysm (true)	18 (2.7%)	14 (1.5%)
Inflammatory aneurysm (sterile)	0 (0.0%)	1 (0.1%)
Dissection without aneurysm formation	0 (0.0%)	1 (0.1%)
Obstruction intraluminally	78 (11.5%)	132 (14.4%)
Obstruction wall pathology	34 (5.0%)	49 (5.3%)
Obstruction by external compression	1 (0.1%)	1 (0.1%)
AV-malformation	3 (0.4%)	0 (0.0%)
No vascular pathology / vascular access or diagnostic procedures)	5 (0.7%)	130 (14.2%)
Source of emboli w/o pathology of the vessel wall	3 (0.4%)	1 (0.1%)
Tumor	0 (0.0%)	1 (0.1%)
Sterility		
N-Miss	14	0
Infected or presumably infected	5 (0.7%)	15 (1.6%)

	2022 (N=686)	2023 (N=934)
Sterile operation	667 (99.3%)	919 (98.4%)
Age (years)		
N-Miss	0	2
Mean (SD)	67.0 (13.7)	65.7 (14.4)
Range	2.0 - 91.0	0.0 - 92.0
Sex		
N-Miss	1	4
Male	449 (65.5%)	593 (63.8%)
Female	236 (34.5%)	337 (36.2%)
Complication		
N-Miss	363	293
No	303 (93.8%)	583 (91.0%)
Yes	20 (6.2%)	58 (9.0%)
ClavienDindo		
N-Miss	363	293
Grade 0 - No Complication	303 (93.8%)	583 (91.0%)
Grade I	3 (0.9%)	5 (0.8%)
Grade I disability	1 (0.3%)	3 (0.5%)
Grade II	0 (0.0%)	9 (1.4%)
Grade IIIa	5 (1.5%)	4 (0.6%)
Grade IIIb	10 (3.1%)	36 (5.6%)
Grade V - Death	1 (0.3%)	1 (0.2%)
30-Day Patency		
Yes	29 (4.2%)	114 (12.2%)
No	2 (0.3%)	18 (1.9%)
Missing	655 (95.5%)	802 (85.9%)

13 Treatment of Deep Veins

Table 21: Treatment of Deep Veins

	2022 (N=53)	2023 (N=59)	p value
Segment			0.429
Deep pelvic veins	8 (15.1%)	10 (16.9%)	
Vena cava inferior	12 (22.6%)	6 (10.2%)	
Vena cava superior	0 (0.0%)	1 (1.7%)	
Subclavian vein axillary vein	1 (1.9%)	2 (3.4%)	
Arm veins	3 (5.7%)	1 (1.7%)	
Deep leg veins including femoral bifurcation	27 (50.9%)	35 (59.3%)	
Portal vein	2 (3.8%)	4 (6.8%)	
Pathology			0.334
N-Miss	0	1	
No vascular pathology	3 (5.7%)	0 (0.0%)	
Vascular wall injury / pseudoaneurysm	21 (39.6%)	18 (31.0%)	
Aneurysm (true)	0 (0.0%)	2 (3.4%)	
Obstruction intraluminally	20 (37.7%)	26 (44.8%)	
Obstruction wall pathology	1 (1.9%)	1 (1.7%)	
Obstruction by external compression	3 (5.7%)	2 (3.4%)	
AV-malformation	0 (0.0%)	2 (3.4%)	
Source of emboli w/o pathology of the vessel wall	0 (0.0%)	1 (1.7%)	
Tumor	5 (9.4%)	6 (10.3%)	
Vascular Intervention			0.332
Vascular graft	7 (13.2%)	5 (8.5%)	
Repair of vessel wall	16 (30.2%)	23 (39.0%)	
Isolated dilatation (PTA/Stent)	3 (5.7%)	3 (5.1%)	
Mural desobliteration w/wo patch	2 (3.8%)	0 (0.0%)	
Luminal desobliteration (e.g. embolectomy)	15 (28.3%)	25 (42.4%)	
Sealing	1 (1.9%)	0 (0.0%)	
Therapeutic occlusion of vessels	3 (5.7%)	2 (3.4%)	
Resection of av-malform	1 (1.9%)	0 (0.0%)	
Creation of a therapeutic AV-fistula	2 (3.8%)	1 (1.7%)	
De-/rebranching	2 (3.8%)	0 (0.0%)	
Imaging	1 (1.9%)	0 (0.0%)	
Sterility			0.189
Infected or presumably infected	2 (3.8%)	6 (10.2%)	
Sterile operation	51 (96.2%)	53 (89.8%)	
Sex			0.648
Male	31 (58.5%)	37 (62.7%)	
Female	22 (41.5%)	22 (37.3%)	
Age (years)			0.913
Mean (SD)	56.6 (19.9)	56.2 (17.3)	
Range	18.0 - 93.0	17.0 - 92.0	
Complication			0.252
N-Miss	15	8	
No	24 (63.2%)	26 (51.0%)	
Yes	14 (36.8%)	25 (49.0%)	
ClavienDindo			0.214
N-Miss	15	8	
Grade 0 - No Complication	24 (63.2%)	26 (51.0%)	
Grade I	1 (2.6%)	3 (5.9%)	

	2022 (N=53)	2023 (N=59)	p value
Grade II	3 (7.9%)	8 (15.7%)	
Grade II disability	2 (5.3%)	1 (2.0%)	
Grade IIIb	4 (10.5%)	10 (19.6%)	
Grade IVa	0 (0.0%)	2 (3.9%)	
Grade V - Death	4 (10.5%)	1 (2.0%)	
30-Day Patency			0.009
Yes	5 (9.4%)	15 (25.4%)	
No	0 (0.0%)	4 (6.8%)	
Missing	48 (90.6%)	40 (67.8%)	

14 Treatment of Varicosis

Table 22: Surgery on Superficial Veins

	2022 (N=2302)	2023 (N=3777)	p value
SGG OP Code			< 0.001
Combination of 11A to 11D	152 (6.6%)	121 (3.2%)	
Crossectomy with stripping (VSM or VSP or VSAA)	298 (12.9%)	493 (13.1%)	
Endovenous varicosis treatment	951 (41.3%)	1353 (35.8%)	
Isolated native crossectomy or revision	101 (4.4%)	128 (3.4%)	
Isolated stripping of VSM or VSP	32 (1.4%)	52 (1.4%)	
Perforator ligation	157 (6.8%)	280 (7.4%)	
Ulcer treatment with plastic reconstruction	4 (0.2%)	10 (0.3%)	
Varicosis vein dissection	607 (26.4%)	1340 (35.5%)	
Sex			0.134
N-Miss	1	0	
Male	977 (42.5%)	1530 (40.5%)	
Female	1324 (57.5%)	2247 (59.5%)	
Age (years)			0.456
N-Miss	0	14	
Mean (SD)	54.0 (15.1)	54.3 (14.6)	
Range	0.0 - 93.0	14.0 - 95.0	
Setting			< 0.001
N-Miss	4	4	
Outpatient	1801 (78.4%)	3166 (83.9%)	
Inpatient	497 (21.6%)	607 (16.1%)	
Complication			0.854
N-Miss	1550	2868	
No	737 (98.0%)	892 (98.1%)	
Yes	15 (2.0%)	17 (1.9%)	
ClavienDindo			0.087
N-Miss	1550	2868	
Grade 0 - No Complication	737 (98.0%)	892 (98.1%)	
Grade I	1 (0.1%)	0 (0.0%)	
Grade I disability	2 (0.3%)	0 (0.0%)	
Grade II	10 (1.3%)	11 (1.2%)	
Grade IIIb	0 (0.0%)	5 (0.6%)	
Grade IVa	2 (0.3%)	0 (0.0%)	
Grade V - Death	0 (0.0%)	1 (0.1%)	

15 Amputations and other Soft Tissue Procedures

Table 23: Amputations and other non-vascular procedures

	2022 (N=3546)	2023 (N=3871)	p value
Procedure			0.010
N-Miss	23	19	
Amputation of finger of hand	1 (0.0%)	0 (0.0%)	
Amputation of hindfoot	7 (0.2%)	5 (0.1%)	
Amputation of lower leg	148 (4.2%)	180 (4.7%)	
Amputation of metatarsus	205 (5.8%)	188 (4.9%)	
Amputation of thigh	59 (1.7%)	38 (1.0%)	
Amputation of toe	502 (14.2%)	605 (15.7%)	
Compartment Decompression abdominal	23 (0.7%)	24 (0.6%)	
Compartment Decompression thoracic	2 (0.1%)	1 (0.0%)	
Fasciotomy	127 (3.6%)	143 (3.7%)	
Hip disarticulation	1 (0.0%)	0 (0.0%)	
Pacemaker Explantation	3 (0.1%)	1 (0.0%)	
Pacemaker Implantation	2 (0.1%)	0 (0.0%)	
Port Explantation	133 (3.8%)	122 (3.2%)	
Port Implantation	357 (10.1%)	410 (10.6%)	
Surgery on lymphatic drain disorder	15 (0.4%)	13 (0.3%)	
Through-knee amputation	11 (0.3%)	4 (0.1%)	
Ulcer treatment with plastic reconstruction	4 (0.1%)	10 (0.3%)	
Wound closure (2° or Thiersch)	327 (9.3%)	359 (9.3%)	
Wound Debridement w/o NPWT	514 (14.6%)	642 (16.7%)	
Wound Debridement with NPWT	1082 (30.7%)	1107 (28.7%)	
Sex			0.886
N-Miss	1	1	
Male	2322 (65.5%)	2541 (65.7%)	
Female	1223 (34.5%)	1329 (34.3%)	
Age (years)			0.378
N-Miss	0	2	
Mean (SD)	70.1 (13.4)	70.4 (13.3)	
Range	16.0 - 100.0	0.0 - 103.0	
Complication			0.092
N-Miss	1310	1261	
No	1027 (45.9%)	1262 (48.4%)	
Yes	1209 (54.1%)	1348 (51.6%)	
ClavienDindo			< 0.001
N-Miss	1310	1261	
Grade 0 - No Complication	1027 (45.9%)	1262 (48.4%)	
Grade I	41 (1.8%)	54 (2.1%)	
Grade I disability	7 (0.3%)	5 (0.2%)	
Grade II	202 (9.0%)	287 (11.0%)	
Grade II disability	32 (1.4%)	52 (2.0%)	
Grade IIIa	24 (1.1%)	31 (1.2%)	
Grade IIIa disability	2 (0.1%)	3 (0.1%)	
Grade IIIb	551 (24.6%)	520 (19.9%)	
Grade IIIb disability	108 (4.8%)	52 (2.0%)	
Grade IVa	146 (6.5%)	115 (4.4%)	
Grade IVa disability	12 (0.5%)	6 (0.2%)	
Grade IVb	7 (0.3%)	37 (1.4%)	

	2022 (N=3546)	2023 (N=3871)	p value
Grade IVb disability	2 (0.1%)	5 (0.2%)	
Grade V - Death	75 (3.4%)	181 (6.9%)	

Swissvasc Performance Report 2020 - 2023

Lorenz Meuli MD MSc

01 May 2024

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1 Introduction

The aim of this report is to transparently present the treatment results of a series of vascular interventions performed in Switzerland. To maximize comparability, the cases compared are defined within narrow limits. This automatically leads to lower case numbers compared to the figures in the Swissvasc Annual Report, where a broader filter is intended to reflect the annual case number (i.e. workload) for each clinic. To increase the number of cases (and events), this report includes cases treated within a period of four years, i.e. between 2020 and 2023.

1.1 Statistical Analysis

Number of procedures and patient's characteristics are summarized and presented by tables. Continuous variables were summarized by mean and standard deviation if normally distributed or by median and range if skewed. Continuous variables are compared using student's t-test if normally distributed or Mann-Whitney-U test if skewed, respectively. Categorical variables were summarized with counts and percentages for each level of the variable and compared using Pearson's Chi2 test. All p-values are two-sided.

1.1.1 Multivariable Analysis on Survival

The multivariable analysis on survival at discharge of the overall AAA cohort (described in detail below) was performed as follows:

- Missing survival information at discharge was counted as “not documented alive at discharge”. The analysis compares “alive at discharge” with “not documented alive at discharge” which includes missing survival information and documented death.
- A multivariable logistic regression model on survival at discharge is built including baseline characteristics (age and sex), comorbidities (diabetes, renal function, hearth failure, and COPD), procedural factors (asymptomatic vs symptomatic vs rupture; supra- vs. infrarenal; endovascular vs. open-repair), and your clinic vs the rest of Switzerland
- Some factor levels were merged to avoid small numbers per level (e.g. KDIGO G4 & G5 are merged to one category; NYHA III & IV are merged to one category).
- Outliers for the continuous variable age were removed (i.e. patients with age < 40)
- Multiple imputations were performed for missing comorbidities. This is a statistical method used to analyze datasets where some values are missing. Predictive mean matching was used for age, multinomial logistic regressions were used to impute factor variables. The number of imputed datasets was m=25. Details on the missingness of data are available in Appendix I.
- Data imputation is generally preferred to a complete case analysis. This method intends to reduce bias due to a selection of complete cases only.

1.1.2 Density Plots

Density plots are used to visualize continuous variables such as aneurysm diameter. Density plots are a variation of a classical histogram. Instead of bins, a weighted average of neighboring observations is used (i.e. Kernel smoother).

1.1.3 Funnel Plots

The funnel plots shown reflect the proportion of patients for whom the event in question did not occur (i.e. living patients; patients without stroke; patients with open reconstruction). Missing information was not counted as “event-free”. Missing information therefore includes both the occurrence of the event (i.e. death, stroke, occluded reconstruction) as well as missing information.

Each participating clinic is represented by a grey dot on the diagram, your clinic is indicated by a red dot. On the x-axis is the total number of procedures performed. On the y-axis is the proportion of event-free

patients (“higher is better”). The blue dashed line shows the mean value in Switzerland (=benchmark). The black lines indicate the 95% “control limit” for the benchmark, which is based on a normal approximation to the binomial distribution. The control limit separates samples that differ significantly from the population from those that do not. However, it does not allow statistical comparisons between samples.

Further reading:

Spiegelhalter D. J. (2005). Funnel plots for comparing institutional performance. *Statistics in medicine*, 24(8), 1185–1202. <https://doi.org/10.1002/sim.1970>

Rakow, T., Wright, R. J., Spiegelhalter, D. J., & Bull, C. (2015). The pros and cons of funnel plots as an aid to risk communication and patient decision making. *British journal of psychology* (London, England : 1953), 106(2), 327–348. <https://doi.org/10.1111/bjop.12081>

1.2 SwissVasc Dataexport

Date of data export: 19th of April 2024.

A minimum set of information is required to be included in this analysis:

- Date of procedure, date of admission, and date of discharge must be reported.

Data must be plausible:

- Length of Stay must be >0 days (i.e. date of discharge must be $>$ than date of admission).
- Age must be > 0 years (i.e. date of birth must be $>$ than date of admission).
- Date must be plausible (i.e. segment and treatment must be a plausible combination).

1.3 Use of Figures and Tables

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1.4 Errors

Please report inconsistencies or mistakes of this report to lorenz.meuli@pm.me

2 Abdominal Aortic Aneurysms - Overall Analysis

To increase comparability, the cohort was defined as follows: Open or endovascular procedures at the native suprarenal or infrarenal aorto-iliac segment for true aneurysms; only sterile procedures for patients with no clinical problem, symptomatic patients or bleeding and no previous intervention at the same location. Further, only patients where the vascular intervention was either a “vascular graft” or a “bifurcated graft”, were included. Thus, complex open or endovascular abdominal aortic aneurysm repairs are excluded.

2.1 Baseline Characteristics

Table 1: Patients treated for AAA (asymptomatic, symptomatic, or ruptured)

	2020 (N=619)	2021 (N=616)	2022 (N=655)	2023 (N=739)	p value
Segment					0.391
Aorto-iliac including suprarenal segment	104 (16.8%)	108 (17.5%)	124 (18.9%)	149 (20.2%)	
Aorto-iliac including infrarenal segment	515 (83.2%)	508 (82.5%)	531 (81.1%)	590 (79.8%)	
Clinical Problem					0.010
No problem	453 (73.2%)	489 (79.4%)	518 (79.1%)	606 (82.0%)	
Symptomatic	84 (13.6%)	60 (9.7%)	64 (9.8%)	63 (8.5%)	
Bleeding	82 (13.2%)	67 (10.9%)	73 (11.1%)	70 (9.5%)	
Sex					0.808
N-Miss	0	1	0	1	
Male	537 (86.8%)	532 (86.5%)	564 (86.1%)	648 (87.8%)	
Female	82 (13.2%)	83 (13.5%)	91 (13.9%)	90 (12.2%)	
Age (years)					0.132
N-Miss	0	0	1	1	
Mean (SD)	73.0 (8.7)	74.0 (8.4)	73.9 (8.4)	73.6 (8.6)	
Median (Q1, Q3)	74.0 (67.0, 79.0)	75.0 (69.0, 80.0)	74.5 (69.0, 80.0)	74.0 (68.0, 80.0)	
Renal Failure					< 0.001
G1 eGFR > 90	72 (11.6%)	64 (10.4%)	84 (12.8%)	96 (13.0%)	
G2 eGFR 60-89	201 (32.5%)	239 (38.8%)	273 (41.7%)	297 (40.2%)	
G3a eGFR 45-59	67 (10.8%)	89 (14.4%)	96 (14.7%)	121 (16.4%)	
G3b eGFR 30-44	34 (5.5%)	45 (7.3%)	30 (4.6%)	51 (6.9%)	
G4 eGFR 15-29	13 (2.1%)	13 (2.1%)	7 (1.1%)	19 (2.6%)	
G5 eGFR <15 or dialysis	7 (1.1%)	5 (0.8%)	4 (0.6%)	4 (0.5%)	
Unknown	225 (36.3%)	161 (26.1%)	161 (24.6%)	151 (20.4%)	
COPD					0.611
N-Miss	123	112	80	88	
No COPD	331 (66.7%)	316 (62.7%)	368 (64.0%)	433 (66.5%)	
COPD w/o medication	39 (7.9%)	56 (11.1%)	48 (8.3%)	61 (9.4%)	
COPD with medication	42 (8.5%)	40 (7.9%)	47 (8.2%)	41 (6.3%)	
COPD with O2 therapy	1 (0.2%)	2 (0.4%)	5 (0.9%)	5 (0.8%)	
Unknown	83 (16.7%)	90 (17.9%)	107 (18.6%)	111 (17.1%)	
Heart Failure					0.108
N-Miss	123	112	80	89	
No heart failure	278 (56.0%)	297 (58.9%)	347 (60.3%)	381 (58.6%)	
NYHA I	70 (14.1%)	57 (11.3%)	73 (12.7%)	105 (16.2%)	
NYHA II	45 (9.1%)	40 (7.9%)	52 (9.0%)	68 (10.5%)	

	2020 (N=619)	2021 (N=616)	2022 (N=655)	2023 (N=739)	p value
NYHA III	14 (2.8%)	15 (3.0%)	18 (3.1%)	9 (1.4%)	
NYHA IV	1 (0.2%)	2 (0.4%)	0 (0.0%)	1 (0.2%)	
Unknown	88 (17.7%)	93 (18.5%)	85 (14.8%)	86 (13.2%)	

2.2 Multivariable Analysis on Survival at Discharge

This multivariable analysis on survival at discharge of the overall AAA cohort (described above) was performed as described in detail in section 1.1.1.

Note 1: The event of interest included “death” and “missing information at discharge” and was compared to being discharged alive.

Note 2: Odds ratios that are greater than 1 indicate that the event (not being discharged alive) was more likely for the level of the variable compared to the reference level. Odds ratios that are less than 1 indicate that the event (not being discharged alive) was less likely at level of the variable compared to the reference level.

Variable	N	Odds ratio	OR with 95%-CI	p-value
Age	2024		1.05 (1.00, 1.11)	0.048
Sex	Male		Reference	
	Female		0.96 (0.31, 2.40)	0.929
Diabetes	No (incl. only diet)		Reference	
	Oral antidiabetics		1.15 (0.40, 2.82)	0.775
	Insulin		1.91 (0.28, 7.31)	0.414
RenalFailure	G1 eGFR > 90		Reference	
	G2 eGFR 60–89		0.87 (0.27, 3.30)	0.815
	G3a eGFR 45–59		1.73 (0.51, 6.88)	0.400
	G3b eGFR 30–44		0.82 (0.14, 4.34)	0.812
	G4–5 eGFR <30 or dialysis		1.35 (0.28, 6.62)	0.704
HeartFailure	No heart failure, incl. NYHA I		Reference	
	NYHA II		1.15 (0.27, 3.50)	0.823
	NYHA III / IV		3.87 (1.28, 10.66)	0.011
COPD	No COPD		Reference	
	COPD w/o medication		0.84 (0.19, 2.56)	0.783
	COPD with medication		0.79 (0.25, 2.13)	0.661
Presentation	Asymptomatic		Reference	
	Symptomatic		1.62 (0.45, 4.66)	0.405
	Rupture		7.31 (3.28, 16.21)	<0.001
Segment	Aorto-iliac including suprarenal segment		Reference	
	Aorto-iliac including infrarenal segment		0.71 (0.32, 1.61)	0.402
Approach	Open surgery		Reference	
	Endovascular intervention		0.36 (0.16, 0.82)	0.015

3 Elective repair of AAA

To increase comparability, the cohort was defined as follows: Open or endovascular procedures at the native suprarenal or infrarenal aorto-iliac segment for true aneurysms; only sterile procedures for patients with no clinical problem and no previous intervention at the same location. Further, only patients where the vascular intervention was either a “vascular graft” or a “bifurcated graft” were included. Thus, complex open or endovascular abdominal aortic aneurysm repairs are excluded.

3.1 Diameter Analysis 2020 - 2023

Table 2: AAA Diameter (overall)

	2020 (N=453)	2021 (N=489)	2022 (N=518)	2023 (N=606)	P value
Aneurysm Diameter (mm)					0.916
N-Miss	1	2	1	3	
Mean (SD)	57.5 (11.4)	57.6 (10.7)	57.4 (10.7)	57.1 (12.7)	
Median (Q1, Q3)	56.0 (53.0, 62.0)	56.0 (53.0, 60.0)	56.0 (53.0, 61.0)	56.0 (53.0, 61.0)	
Sex					0.446
N-Miss	0	1	0	1	
Male	398 (87.9%)	419 (85.9%)	447 (86.3%)	537 (88.8%)	
Female	55 (12.1%)	69 (14.1%)	71 (13.7%)	68 (11.2%)	

3.1.1 AAA Diameter Females

Table 3: AAA Diameter (female only)

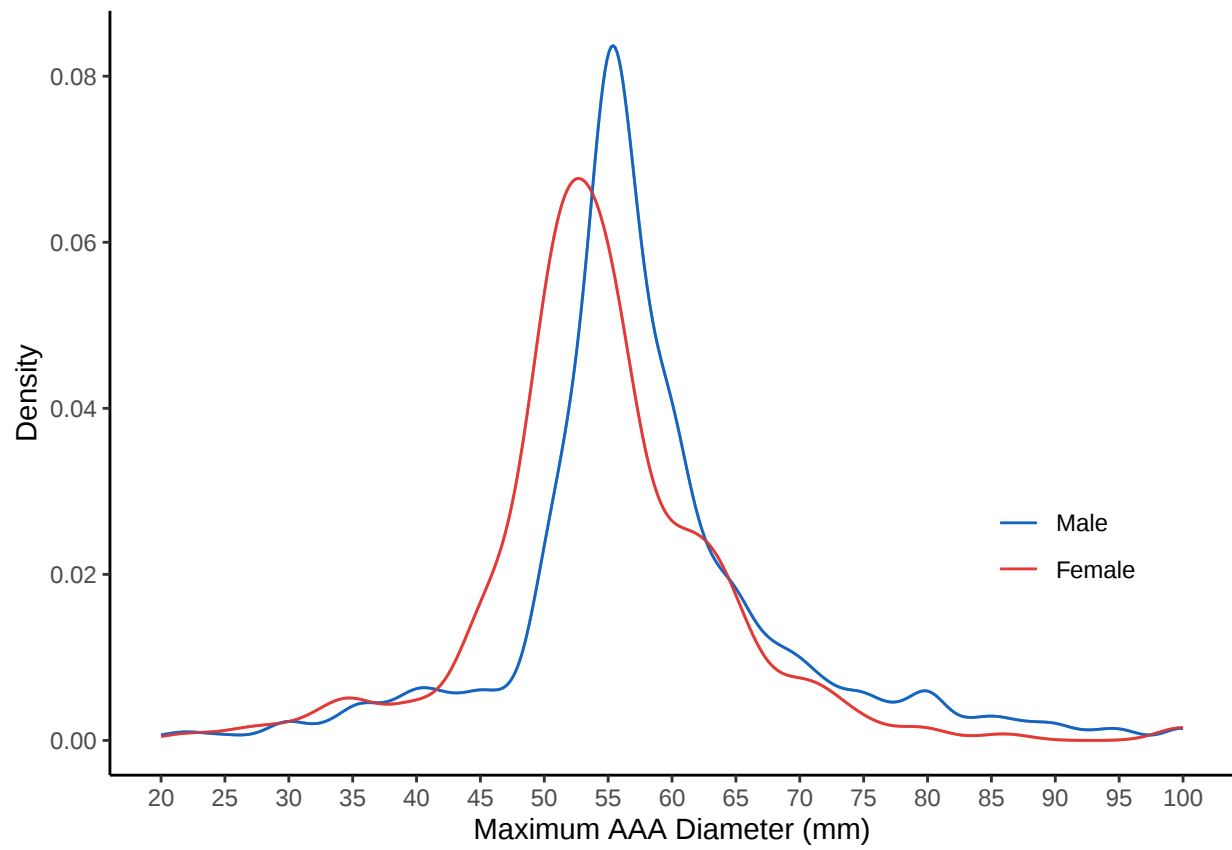
	2020 (N=55)	2021 (N=69)	2022 (N=71)	2023 (N=68)	P value
Aneurysm Diameter (mm)					0.031
N-Miss	1	0	0	0	
Mean (SD)	56.4 (7.8)	56.2 (9.8)	52.3 (10.4)	53.0 (11.1)	
Median (Q1, Q3)	55.0 (52.0, 61.0)	54.0 (51.0, 59.0)	52.0 (50.0, 56.0)	53.0 (48.8, 57.2)	

3.1.2 AAA Diameter Males

Table 4: AAA Diameter (male only)

	2020 (N=398)	2021 (N=419)	2022 (N=447)	2023 (N=537)	P value
Aneurysm Diameter (mm)					0.878
N-Miss	0	2	1	3	
Mean (SD)	57.7 (11.8)	57.8 (10.9)	58.2 (10.5)	57.7 (12.8)	
Median (Q1, Q3)	56.0 (53.0, 62.0)	56.0 (53.0, 60.0)	56.0 (54.0, 62.0)	56.0 (53.0, 62.0)	

3.1.3 Density Plot AAA Diameter

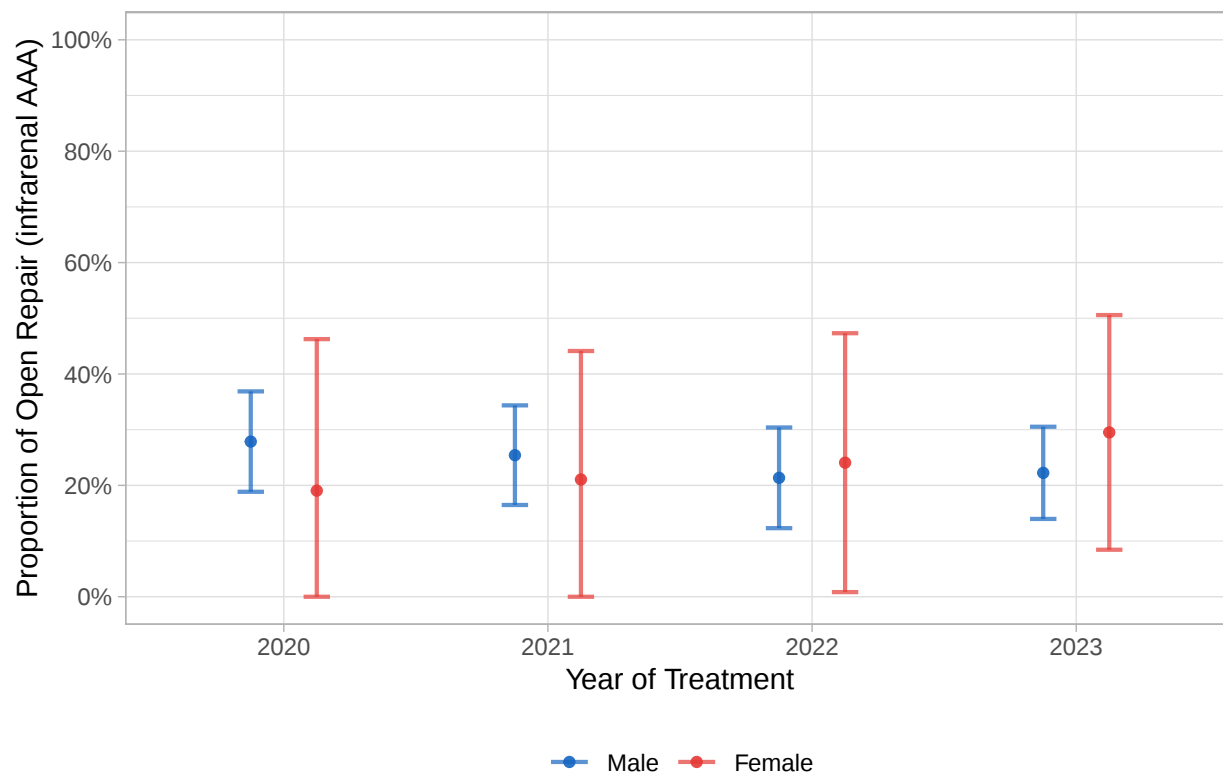


3.2 Baseline Characteristics and Treatment Approach

Table 5: Patients treated for asymptomatic AAA

	2020 (N=453)	2021 (N=489)	2022 (N=518)	2023 (N=606)	p value
Technical Approach					0.559
Open surgery	165 (36.4%)	164 (33.5%)	172 (33.2%)	196 (32.3%)	
Endovascular intervention	288 (63.6%)	325 (66.5%)	346 (66.8%)	410 (67.7%)	
Segment					0.401
Aorto-iliac, suprarenal	70 (15.5%)	73 (14.9%)	94 (18.1%)	108 (17.8%)	
Aorto-iliac, infrarenal	383 (84.5%)	416 (85.1%)	424 (81.9%)	498 (82.2%)	
Sex					0.446
N-Miss	0	1	0	1	
Male	398 (87.9%)	419 (85.9%)	447 (86.3%)	537 (88.8%)	
Female	55 (12.1%)	69 (14.1%)	71 (13.7%)	68 (11.2%)	
Age (years)					0.172
N-Miss	0	0	0	1	
Mean (SD)	72.9 (8.7)	74.0 (8.2)	73.7 (8.1)	73.8 (8.4)	
Median (Q1, Q3)	74.0 (68.0, 79.0)	75.0 (69.0, 80.0)	74.0 (68.2, 79.0)	74.0 (68.0, 80.0)	
Renal Failure					< 0.001
G1 eGFR > 90	56 (12.4%)	54 (11.0%)	63 (12.2%)	75 (12.4%)	
G2 eGFR 60-89	164 (36.2%)	201 (41.1%)	235 (45.4%)	253 (41.7%)	
G3a eGFR 45-59	47 (10.4%)	71 (14.5%)	71 (13.7%)	102 (16.8%)	
G3b eGFR 30-44	21 (4.6%)	34 (7.0%)	24 (4.6%)	37 (6.1%)	
G4 eGFR 15-29	3 (0.7%)	7 (1.4%)	4 (0.8%)	14 (2.3%)	
G5 eGFR <15 or dialysis	5 (1.1%)	3 (0.6%)	2 (0.4%)	2 (0.3%)	
Unknown	157 (34.7%)	119 (24.3%)	119 (23.0%)	123 (20.3%)	
COPD					0.364
N-Miss	101	87	63	76	
No COPD	249 (70.7%)	253 (62.9%)	304 (66.8%)	355 (67.0%)	
COPD w/o medication	28 (8.0%)	46 (11.4%)	34 (7.5%)	53 (10.0%)	
COPD with medication	28 (8.0%)	34 (8.5%)	46 (10.1%)	38 (7.2%)	
COPD with O2 therapy	1 (0.3%)	2 (0.5%)	5 (1.1%)	3 (0.6%)	
Unknown	46 (13.1%)	67 (16.7%)	66 (14.5%)	81 (15.3%)	
Heart Failure					0.389
N-Miss	101	87	63	77	
No heart failure	202 (57.4%)	247 (61.4%)	282 (62.0%)	315 (59.5%)	
NYHA I	59 (16.8%)	49 (12.2%)	69 (15.2%)	85 (16.1%)	
NYHA II	39 (11.1%)	37 (9.2%)	45 (9.9%)	65 (12.3%)	
NYHA III	10 (2.8%)	12 (3.0%)	15 (3.3%)	8 (1.5%)	
NYHA IV	0 (0.0%)	1 (0.2%)	0 (0.0%)	1 (0.2%)	
Unknown	42 (11.9%)	56 (13.9%)	44 (9.7%)	55 (10.4%)	

3.2.1 Proportion Plot on Treatment Approach



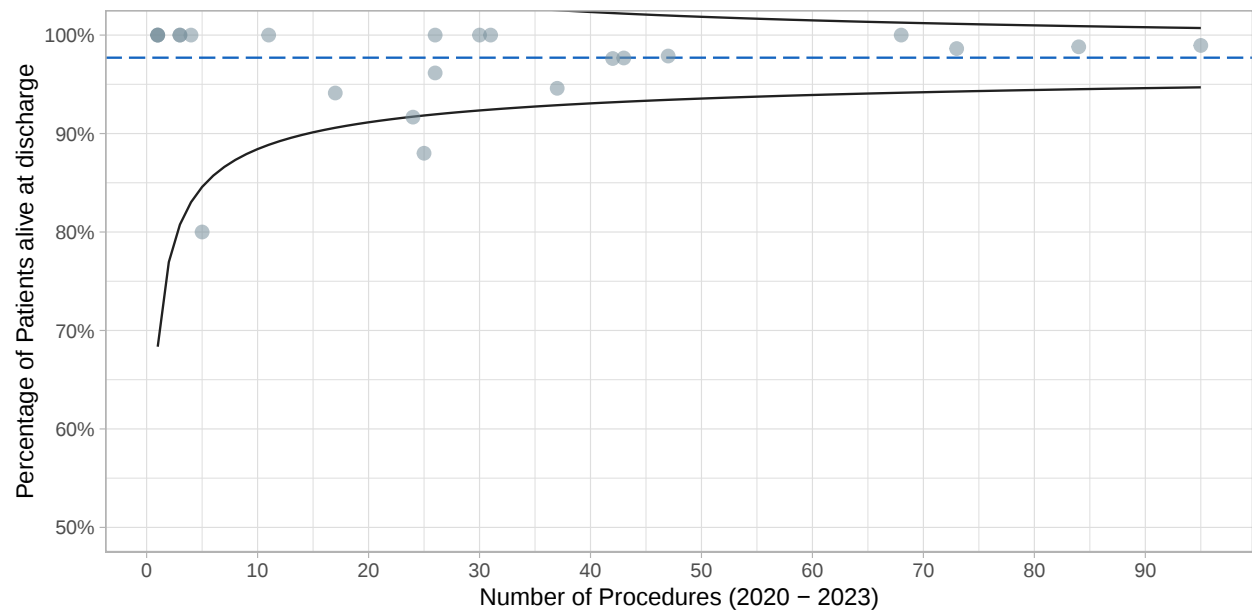
3.3 Elective open repair for AAA

3.3.1 Inhospital outcomes

Table 6: Inhospital outcomes for open repair of asymptomatic AAA

	2020 (N=165)	2021 (N=164)	2022 (N=172)	2023 (N=196)	p value
Segment					0.268
Aorto-iliac, suprarenal	62 (37.6%)	61 (37.2%)	80 (46.5%)	81 (41.3%)	
Aorto-iliac, infrarenal	103 (62.4%)	103 (62.8%)	92 (53.5%)	115 (58.7%)	
Inhospital Mortality					0.527
Dead	4 (2.4%)	5 (3.0%)	4 (2.3%)	2 (1.0%)	
Alive	160 (97.0%)	159 (97.0%)	168 (97.7%)	194 (99.0%)	
Missing	1 (0.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Clavien Dindo at Discharge					< 0.001
Grade 0 - No Complication	82 (49.7%)	93 (56.7%)	99 (57.6%)	112 (57.1%)	
Grade I	6 (3.6%)	4 (2.4%)	7 (4.1%)	19 (9.7%)	
Grade I disability	0 (0.0%)	0 (0.0%)	3 (1.7%)	2 (1.0%)	
Grade II	17 (10.3%)	16 (9.8%)	36 (20.9%)	34 (17.3%)	
Grade II disability	1 (0.6%)	0 (0.0%)	4 (2.3%)	2 (1.0%)	
Grade IIIa	3 (1.8%)	0 (0.0%)	1 (0.6%)	3 (1.5%)	
Grade IIIa disability	0 (0.0%)	0 (0.0%)	1 (0.6%)	0 (0.0%)	
Grade IIIb	4 (2.4%)	12 (7.3%)	3 (1.7%)	7 (3.6%)	
Grade IIIb disability	1 (0.6%)	1 (0.6%)	0 (0.0%)	1 (0.5%)	
Grade IVa	3 (1.8%)	1 (0.6%)	2 (1.2%)	2 (1.0%)	
Grade IVb	1 (0.6%)	1 (0.6%)	0 (0.0%)	1 (0.5%)	
Grade IVb disability	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.5%)	
Grade V - Death	4 (2.4%)	5 (3.0%)	4 (2.3%)	2 (1.0%)	
Missing	43 (26.1%)	31 (18.9%)	12 (7.0%)	10 (5.1%)	

3.3.2 Survival at Discharge



Note: This plot does NOT show mortality at discharge! For Inhospital Mortality, see Table above.

3.3.3 Outcomes during Follow-up

	2020 (N=165)	2021 (N=164)	2022 (N=172)	2023 (N=196)	p value
30d Mortality					0.022
Alive	110 (66.7%)	119 (72.6%)	136 (79.1%)	127 (64.8%)	
Dead	3 (1.8%)	5 (3.0%)	4 (2.3%)	2 (1.0%)	
Missing	52 (31.5%)	40 (24.4%)	32 (18.6%)	67 (34.2%)	
30d Stroke					0.074
Yes	0 (0.0%)	1 (0.6%)	0 (0.0%)	0 (0.0%)	
No	114 (69.1%)	118 (72.0%)	139 (80.8%)	135 (68.9%)	
Missing	51 (30.9%)	45 (27.4%)	33 (19.2%)	61 (31.1%)	
30d Myocardial infraction					0.133
Yes	1 (0.6%)	1 (0.6%)	0 (0.0%)	0 (0.0%)	
No	113 (68.5%)	119 (72.6%)	137 (79.7%)	133 (67.9%)	
Missing	51 (30.9%)	44 (26.8%)	35 (20.3%)	63 (32.1%)	

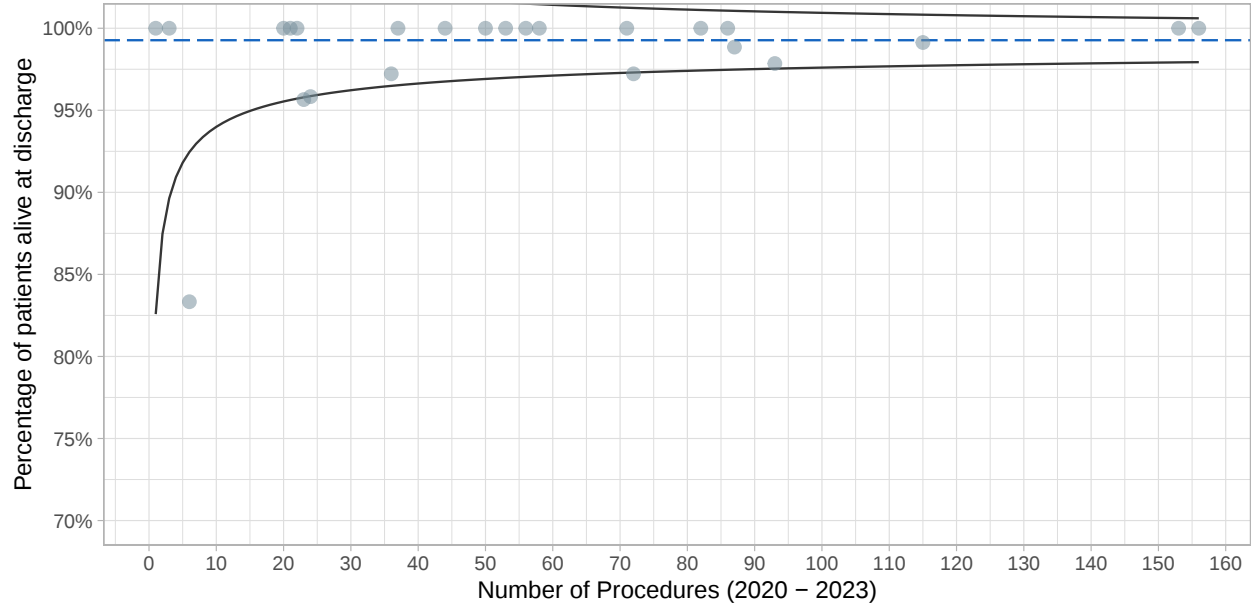
3.4 Elective endovascular repair for AAA

3.4.1 Inhospital Outcomes

Table 8: Inhospital outcomes for endovascular repair of asymptomatic AAA

	2020 (N=288)	2021 (N=325)	2022 (N=346)	2023 (N=410)	p value
Inhospital Mortality					0.027
Dead	0 (0.0%)	1 (0.3%)	3 (0.9%)	3 (0.7%)	
Alive	285 (99.0%)	324 (99.7%)	343 (99.1%)	407 (99.3%)	
Missing	3 (1.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Clavien Dindo at Discharge					0.029
Grade 0 - No Complication	194 (67.4%)	228 (70.2%)	263 (76.0%)	292 (71.2%)	
Grade I	13 (4.5%)	6 (1.8%)	9 (2.6%)	21 (5.1%)	
Grade I disability	0 (0.0%)	1 (0.3%)	2 (0.6%)	5 (1.2%)	
Grade II	10 (3.5%)	13 (4.0%)	17 (4.9%)	26 (6.3%)	
Grade II disability	1 (0.3%)	2 (0.6%)	0 (0.0%)	1 (0.2%)	
Grade IIIa	4 (1.4%)	3 (0.9%)	5 (1.4%)	4 (1.0%)	
Grade IIIa disability	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)	
Grade IIIb	5 (1.7%)	9 (2.8%)	7 (2.0%)	10 (2.4%)	
Grade IIIb disability	0 (0.0%)	0 (0.0%)	1 (0.3%)	0 (0.0%)	
Grade IVa	0 (0.0%)	3 (0.9%)	2 (0.6%)	3 (0.7%)	
Grade IVa disability	0 (0.0%)	0 (0.0%)	1 (0.3%)	0 (0.0%)	
Grade IVb disability	1 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Grade V - Death	0 (0.0%)	1 (0.3%)	3 (0.9%)	3 (0.7%)	
Missing	60 (20.8%)	59 (18.2%)	36 (10.4%)	44 (10.7%)	

3.4.2 Survival at Discharge



Note: This plot does NOT show mortality at discharge! For Inhospital Mortality, see Table above.

3.4.3 Outcomes during Follow-up

	2020 (N=288)	2021 (N=325)	2022 (N=346)	2023 (N=410)	p value
30d Mortality					< 0.001
Alive	196 (68.1%)	212 (65.2%)	197 (56.9%)	196 (47.8%)	
Dead	0 (0.0%)	1 (0.3%)	3 (0.9%)	3 (0.7%)	
Missing	92 (31.9%)	112 (34.5%)	146 (42.2%)	211 (51.5%)	
30d Stroke					0.008
Yes	1 (0.3%)	1 (0.3%)	1 (0.3%)	1 (0.2%)	
No	219 (76.0%)	246 (75.7%)	247 (71.4%)	262 (63.9%)	
Missing	68 (23.6%)	78 (24.0%)	98 (28.3%)	147 (35.9%)	
30d Myocardial infraction					0.003
Yes	2 (0.7%)	1 (0.3%)	0 (0.0%)	1 (0.2%)	
No	218 (75.7%)	245 (75.4%)	249 (72.0%)	262 (63.9%)	
Missing	68 (23.6%)	79 (24.3%)	97 (28.0%)	147 (35.9%)	

4 Emergent repair of ruptured AAA

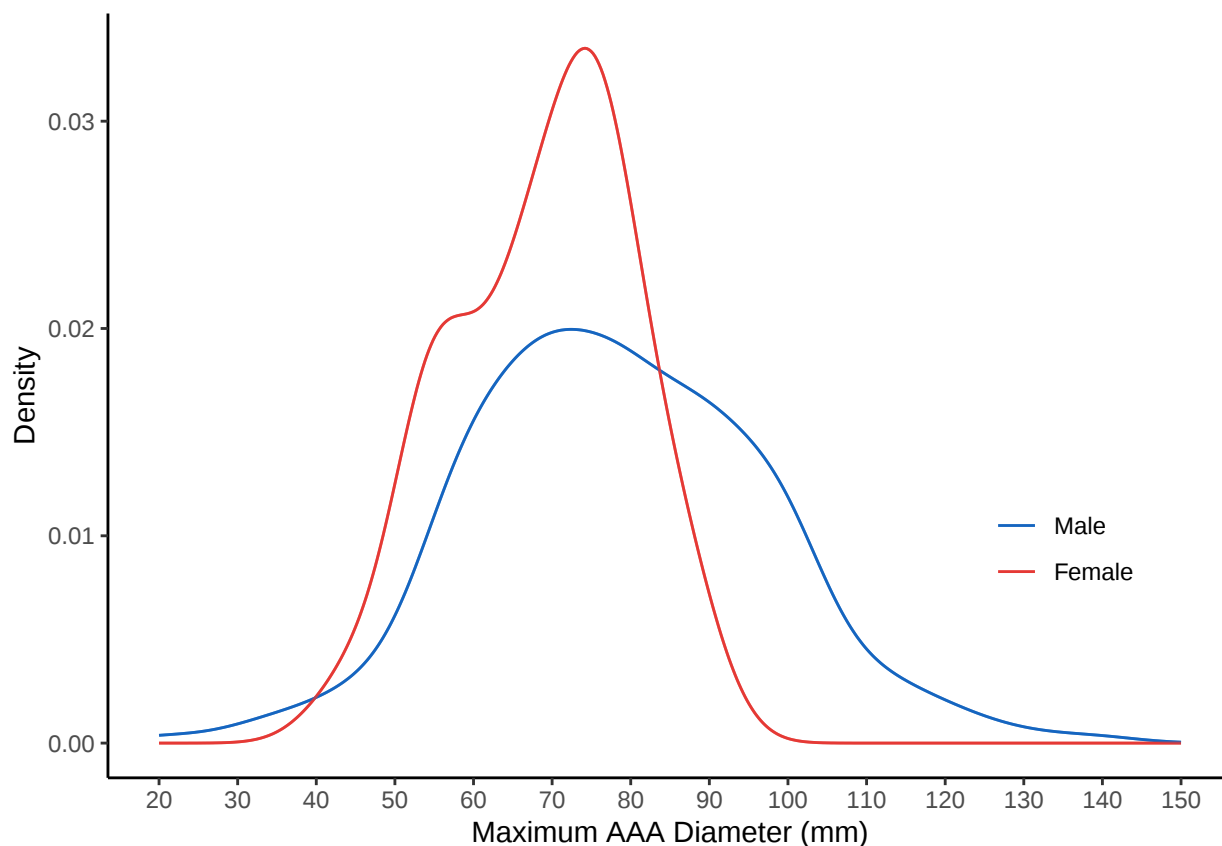
To increase comparability, the cohort was defined as follows: Open or endovascular procedures at the native suprarenal or infrarenal aorto-iliac segment for true aneurysms; only sterile procedures for patients with rupture (=bleeding), and no previous intervention at the same location. Further, only patients where the vascular intervention was either a “vascular graft” or a “bifurcated graft” were included. Thus, complex open or endovascular abdominal aortic aneurysm repairs are excluded.

4.1 Diameter Analysis 2020 - 2023

Table 10: AAA Diameter (ruptured)

	2020 (N=79)	2021 (N=67)	2022 (N=72)	2023 (N=66)	P value
Aneurysm Diameter (mm)					0.457
N-Miss	0	0	3	0	
Mean (SD)	71.4 (26.7)	77.2 (21.6)	74.7 (18.1)	75.3 (21.3)	
Median (Q1, Q3)	75.0 (59.0, 90.0)	78.0 (60.0, 90.0)	74.0 (66.0, 83.0)	76.5 (63.5, 90.0)	

4.1.1 Density Plot rAAA Diameter



4.2 Baseline Characteristics

Table 11: Patients treated for ruptured AAA

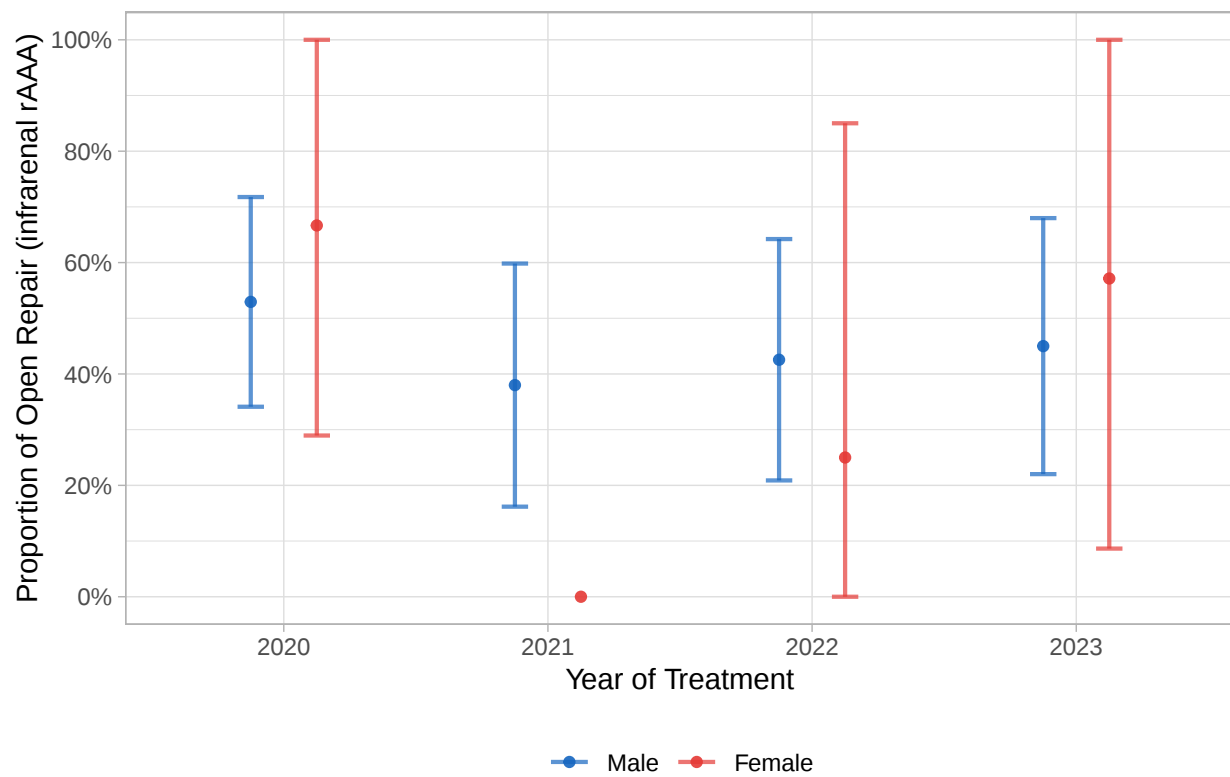
	2020 (N=79)	2021 (N=67)	2022 (N=72)	2023 (N=66)	p value
Segment					0.837
Aorto-iliac, suprarenal	19 (24.1%)	15 (22.4%)	17 (23.6%)	19 (28.8%)	
Aorto-iliac, infrarenal	60 (75.9%)	52 (77.6%)	55 (76.4%)	47 (71.2%)	
Sex					0.058
Male	67 (84.8%)	65 (97.0%)	64 (88.9%)	55 (83.3%)	
Female	12 (15.2%)	2 (3.0%)	8 (11.1%)	11 (16.7%)	
Age (years)					0.133
Mean (SD)	74.5 (8.5)	73.0 (9.5)	76.3 (8.8)	73.2 (10.1)	
N-Miss	0	0	1	0	
Renal Failure					0.334
G1 eGFR > 90	4 (5.1%)	3 (4.5%)	9 (12.5%)	9 (13.6%)	
G2 eGFR 60-89	21 (26.6%)	16 (23.9%)	17 (23.6%)	18 (27.3%)	
G3a eGFR 45-59	10 (12.7%)	14 (20.9%)	15 (20.8%)	12 (18.2%)	
G3b eGFR 30-44	7 (8.9%)	7 (10.4%)	3 (4.2%)	10 (15.2%)	
G4 eGFR 15-29	8 (10.1%)	5 (7.5%)	3 (4.2%)	1 (1.5%)	
G5 eGFR <15 or dialysis	2 (2.5%)	1 (1.5%)	2 (2.8%)	2 (3.0%)	
Unknown	27 (34.2%)	21 (31.3%)	23 (31.9%)	14 (21.2%)	
COPD					0.003
N-Miss	14	13	8	7	
No COPD	33 (50.8%)	33 (61.1%)	31 (48.4%)	38 (64.4%)	
COPD w/o medication	2 (3.1%)	6 (11.1%)	4 (6.2%)	4 (6.8%)	
COPD with medication	8 (12.3%)	2 (3.7%)	0 (0.0%)	1 (1.7%)	
COPD with O2 therapy	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (3.4%)	
Unknown	22 (33.8%)	13 (24.1%)	29 (45.3%)	14 (23.7%)	
Heart Failure					0.496
N-Miss	14	13	8	7	
No heart failure	28 (43.1%)	23 (42.6%)	29 (45.3%)	32 (54.2%)	
NYHA I	4 (6.2%)	4 (7.4%)	4 (6.2%)	9 (15.3%)	
NYHA II	2 (3.1%)	1 (1.9%)	3 (4.7%)	2 (3.4%)	
NYHA III	3 (4.6%)	1 (1.9%)	1 (1.6%)	1 (1.7%)	
Unknown	28 (43.1%)	25 (46.3%)	27 (42.2%)	15 (25.4%)	

4.3 Treatment Details

Table 12: Patients treated for ruptured AAA

	2020 (N=79)	2021 (N=67)	2022 (N=72)	2023 (N=66)	p value
Technical Approach					0.229
Open surgery	52 (65.8%)	34 (50.7%)	39 (54.2%)	41 (62.1%)	
Endovascular intervention	27 (34.2%)	33 (49.3%)	33 (45.8%)	25 (37.9%)	
Segment					0.837
Aorto-iliac, suprarenal	19 (24.1%)	15 (22.4%)	17 (23.6%)	19 (28.8%)	
Aorto-iliac, infrarenal	60 (75.9%)	52 (77.6%)	55 (76.4%)	47 (71.2%)	
Sex					0.058
Male	67 (84.8%)	65 (97.0%)	64 (88.9%)	55 (83.3%)	
Female	12 (15.2%)	2 (3.0%)	8 (11.1%)	11 (16.7%)	
Age (years)					0.133
N-Miss	0	0	1	0	
Mean (SD)	74.5 (8.5)	73.0 (9.5)	76.3 (8.8)	73.2 (10.1)	
Renal Failure					0.334
G1 eGFR > 90	4 (5.1%)	3 (4.5%)	9 (12.5%)	9 (13.6%)	
G2 eGFR 60-89	21 (26.6%)	16 (23.9%)	17 (23.6%)	18 (27.3%)	
G3a eGFR 45-59	10 (12.7%)	14 (20.9%)	15 (20.8%)	12 (18.2%)	
G3b eGFR 30-44	7 (8.9%)	7 (10.4%)	3 (4.2%)	10 (15.2%)	
G4 eGFR 15-29	8 (10.1%)	5 (7.5%)	3 (4.2%)	1 (1.5%)	
G5 eGFR <15 or dialysis	2 (2.5%)	1 (1.5%)	2 (2.8%)	2 (3.0%)	
Unknown	27 (34.2%)	21 (31.3%)	23 (31.9%)	14 (21.2%)	
COPD					0.003
N-Miss	14	13	8	7	
No COPD	33 (50.8%)	33 (61.1%)	31 (48.4%)	38 (64.4%)	
COPD w/o medication	2 (3.1%)	6 (11.1%)	4 (6.2%)	4 (6.8%)	
COPD with medication	8 (12.3%)	2 (3.7%)	0 (0.0%)	1 (1.7%)	
COPD with O2 therapy	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (3.4%)	
Unknown	22 (33.8%)	13 (24.1%)	29 (45.3%)	14 (23.7%)	
Heart Failure					0.496
N-Miss	14	13	8	7	
No heart failure	28 (43.1%)	23 (42.6%)	29 (45.3%)	32 (54.2%)	
NYHA I	4 (6.2%)	4 (7.4%)	4 (6.2%)	9 (15.3%)	
NYHA II	2 (3.1%)	1 (1.9%)	3 (4.7%)	2 (3.4%)	
NYHA III	3 (4.6%)	1 (1.9%)	1 (1.6%)	1 (1.7%)	
Unknown	28 (43.1%)	25 (46.3%)	27 (42.2%)	15 (25.4%)	

4.3.1 Treatment Approach

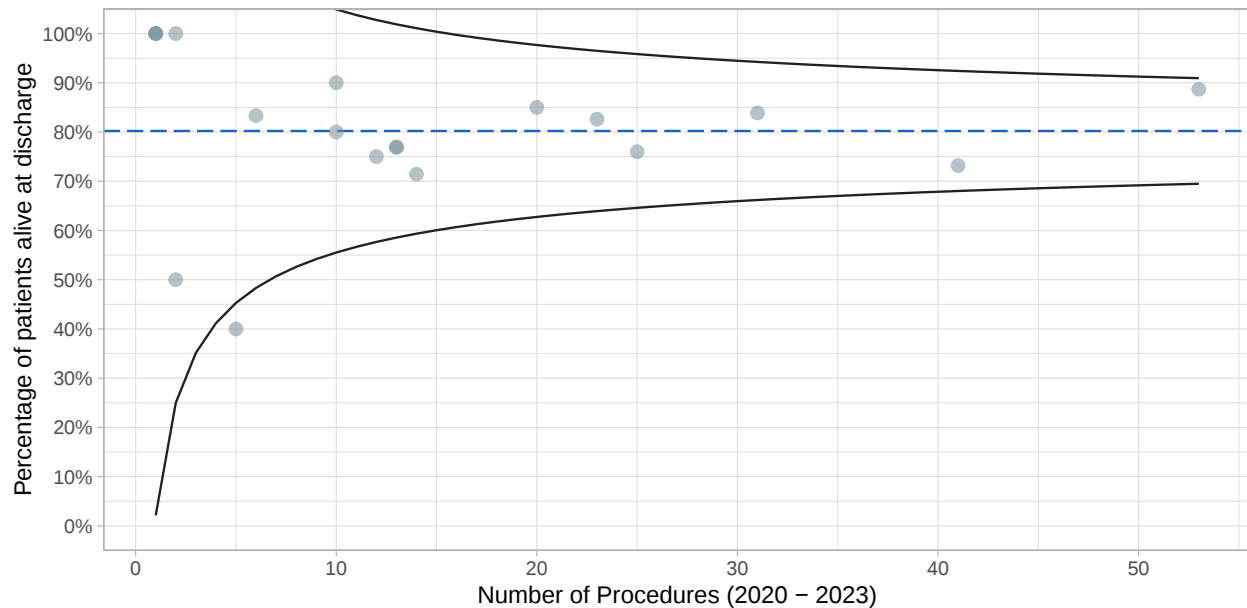


4.4 Inhospital Outcomes

Table 13: Inhospital outcomes for emergent repair of ruptured AAA

	2020 (N=79)	2021 (N=67)	2022 (N=72)	2023 (N=66)	p value
Inhospital Mortality					0.677
Dead	17 (21.5%)	12 (17.9%)	16 (22.2%)	11 (16.7%)	
Alive	62 (78.5%)	55 (82.1%)	55 (76.4%)	55 (83.3%)	
Missing	0 (0.0%)	0 (0.0%)	1 (1.4%)	0 (0.0%)	
Clavien Dindo at Discharge					0.232
Grade 0 - No Complication	25 (31.6%)	23 (34.3%)	23 (31.9%)	20 (30.3%)	
Grade I	4 (5.1%)	1 (1.5%)	2 (2.8%)	1 (1.5%)	
Grade I disability	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (1.5%)	
Grade II	8 (10.1%)	12 (17.9%)	8 (11.1%)	15 (22.7%)	
Grade II disability	2 (2.5%)	1 (1.5%)	2 (2.8%)	4 (6.1%)	
Grade IIIa	5 (6.3%)	2 (3.0%)	2 (2.8%)	1 (1.5%)	
Grade IIIa disability	1 (1.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Grade IIIb	6 (7.6%)	5 (7.5%)	6 (8.3%)	4 (6.1%)	
Grade IIIb disability	1 (1.3%)	2 (3.0%)	1 (1.4%)	0 (0.0%)	
Grade IVa	1 (1.3%)	2 (3.0%)	9 (12.5%)	7 (10.6%)	
Grade IVa disability	3 (3.8%)	1 (1.5%)	1 (1.4%)	0 (0.0%)	
Grade IVb	0 (0.0%)	1 (1.5%)	1 (1.4%)	2 (3.0%)	
Grade IVb disability	1 (1.3%)	0 (0.0%)	1 (1.4%)	0 (0.0%)	
Grade V - Death	17 (21.5%)	12 (17.9%)	16 (22.2%)	11 (16.7%)	
Missing	5 (6.3%)	5 (7.5%)	0 (0.0%)	0 (0.0%)	

4.4.1 Survival at Discharge



Note: This plot does NOT show mortality at discharge! For Inhospital Mortality, see Table above.

4.5 Outcomes during follow-up

	2020 (N=79)	2021 (N=67)	2022 (N=72)	2023 (N=66)	p value
30d Mortality					0.824
Alive	44 (55.7%)	38 (56.7%)	40 (55.6%)	33 (50.0%)	
Dead	16 (20.3%)	12 (17.9%)	16 (22.2%)	11 (16.7%)	
Missing	19 (24.1%)	17 (25.4%)	16 (22.2%)	22 (33.3%)	
30d Stroke					0.751
Yes	1 (1.3%)	1 (1.5%)	2 (2.8%)	0 (0.0%)	
No	45 (57.0%)	37 (55.2%)	42 (58.3%)	33 (50.0%)	
Missing	33 (41.8%)	29 (43.3%)	28 (38.9%)	33 (50.0%)	
30d Myocardial infraction					0.684
Yes	2 (2.5%)	2 (3.0%)	3 (4.2%)	0 (0.0%)	
No	44 (55.7%)	36 (53.7%)	41 (56.9%)	33 (50.0%)	
Missing	33 (41.8%)	29 (43.3%)	28 (38.9%)	33 (50.0%)	

5 Carotid Artery Stenosis

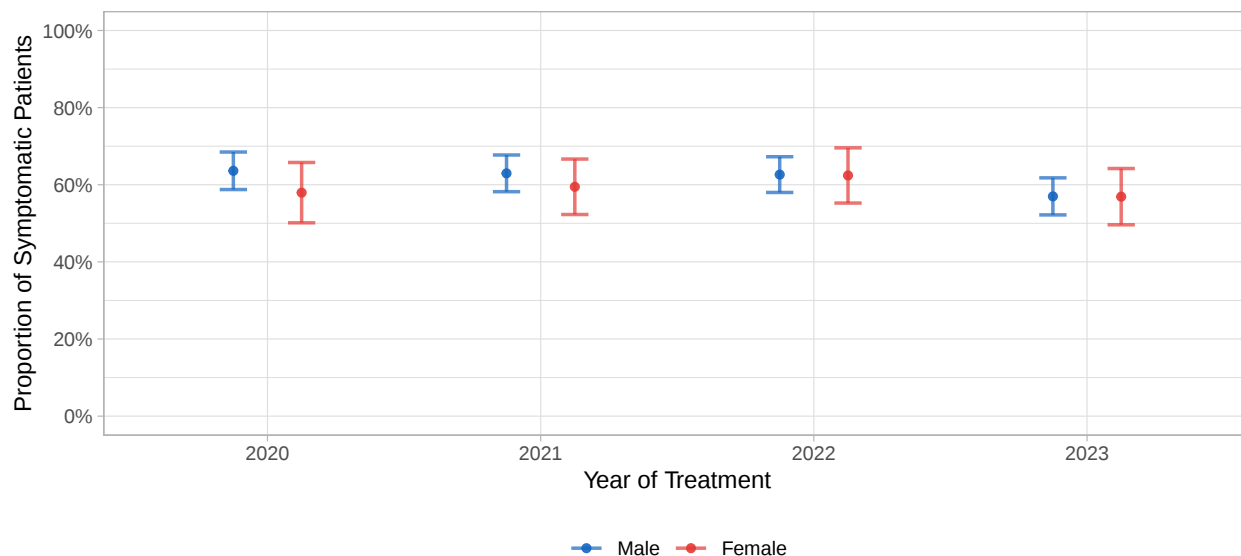
To increase comparability, the cohort was defined as follows: Open or endovascular procedure at the native carotid bifurcation or the carotid artery (CCA, ICA, ECA) for obstructing wall pathology or intraluminal obstruction. Only sterile procedures, only procedures with no previous intervention at the same location, and only symptomatic patients (including “acute ischemia”) or patients with no clinical problem.

5.1 Overview

	2020 (N=855)	2021 (N=930)	2022 (N=951)	2023 (N=1028)	p value
Technical Approach					0.014
Open surgery	692 (80.9%)	742 (79.8%)	803 (84.4%)	813 (79.1%)	
Endovascular intervention	163 (19.1%)	188 (20.2%)	148 (15.6%)	215 (20.9%)	
Clinical Problem					0.008
No problem	244 (28.5%)	276 (29.7%)	294 (30.9%)	328 (31.9%)	
Symptomatic	529 (61.9%)	575 (61.8%)	595 (62.6%)	586 (57.0%)	
Acute Ischemia	82 (9.6%)	79 (8.5%)	62 (6.5%)	114 (11.1%)	

Note: Endovascular procedures are presumably not covered as thoroughly as open surgical procedures.

5.2 Proportion of symptomatic patients



5.3 Indication for Carotid Interventions (ESVS 2023 Guidelines)

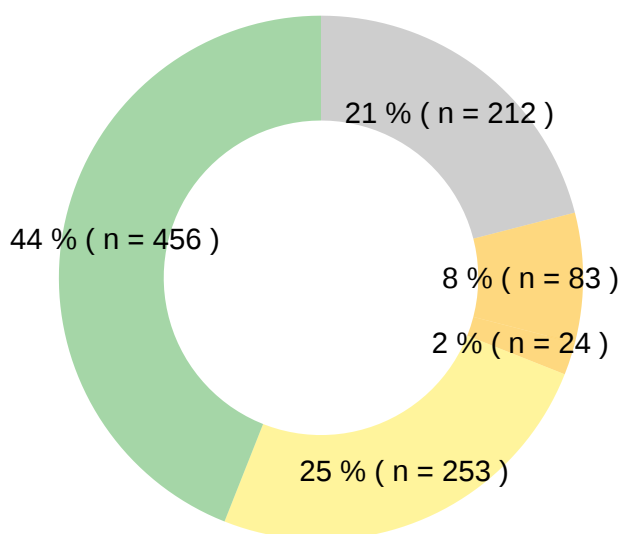
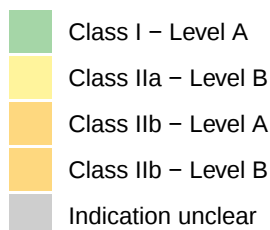
Since 1 January 2023, it has been possible to document carotid stenosis according to the NASCET classification and to document a progression of the stenosis. This information makes it possible to analyse adherence to the current treatment recommendations. However, not all criteria mentioned in the current ESVS guidelines are reflected in Swissvasc, so that other criteria that lead to a treatment indication may be present but are not taken into account here.

Treatment indications were classified according to Figure 2, page 23, and recommendation no. 42 & 43 of the European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on the Management of Atherosclerotic Carotid and Vertebral Artery Disease. DOI: 10.1016/ejects.ejvs.2022.04.011.

Treatment indications that were outside these recommendations were classified as “Indication unclear”.

Table 16: Overall Indication

	2023 (N=1028)
Indication	
Class I - Level A	456 (44.4%)
Class IIa - Level B	253 (24.6%)
Class IIb - Level A	24 (2.3%)
Class IIb - Level B	83 (8.1%)
Indication unclear	212 (20.6%)



5.4 Symptomatic Patients

5.4.1 Baseline Characteristics (CEA and CAS)

	2020 (N=611)	2021 (N=654)	2022 (N=657)	2023 (N=700)	p value
Technical Approach					0.040
Open surgery	458 (75.0%)	477 (72.9%)	521 (79.3%)	518 (74.0%)	
Endovascular intervention	153 (25.0%)	177 (27.1%)	136 (20.7%)	182 (26.0%)	
Sex					0.543
N-Miss	0	0	0	1	
Male	428 (70.0%)	441 (67.4%)	464 (70.6%)	476 (68.1%)	
Female	183 (30.0%)	213 (32.6%)	193 (29.4%)	223 (31.9%)	
Age (years)					0.294
N-Miss	0	0	0	0	
Mean (SD)	74.4 (9.6)	74.9 (9.2)	74.7 (9.3)	73.9 (10.4)	
Renal Failure					< 0.001
G1 eGFR > 90	45 (7.4%)	56 (8.6%)	84 (12.8%)	61 (8.7%)	
G2 eGFR 60-89	170 (27.8%)	225 (34.4%)	231 (35.2%)	238 (34.0%)	
G3a eGFR 45-59	47 (7.7%)	75 (11.5%)	67 (10.2%)	88 (12.6%)	
G3b eGFR 30-44	19 (3.1%)	29 (4.4%)	48 (7.3%)	35 (5.0%)	
G4 eGFR 15-29	11 (1.8%)	12 (1.8%)	7 (1.1%)	13 (1.9%)	
G5 eGFR <15 or dialysis	3 (0.5%)	1 (0.2%)	1 (0.2%)	1 (0.1%)	
Unknown	316 (51.7%)	256 (39.1%)	219 (33.3%)	264 (37.7%)	
COPD					0.037
N-Miss	196	216	159	218	
No COPD	293 (70.6%)	315 (71.9%)	374 (75.1%)	372 (77.2%)	
COPD w/o medication	14 (3.4%)	26 (5.9%)	30 (6.0%)	24 (5.0%)	
COPD with medication	14 (3.4%)	24 (5.5%)	17 (3.4%)	16 (3.3%)	
COPD with O2 therapy	0 (0.0%)	1 (0.2%)	2 (0.4%)	1 (0.2%)	
Unknown	94 (22.7%)	72 (16.4%)	75 (15.1%)	69 (14.3%)	
Heart Failure					0.001
N-Miss	196	216	160	218	
No heart failure	260 (62.7%)	321 (73.3%)	331 (66.6%)	309 (64.1%)	
NYHA I	31 (7.5%)	26 (5.9%)	40 (8.0%)	61 (12.7%)	
NYHA II	26 (6.3%)	13 (3.0%)	25 (5.0%)	27 (5.6%)	
NYHA III	11 (2.7%)	9 (2.1%)	21 (4.2%)	13 (2.7%)	
NYHA IV	0 (0.0%)	2 (0.5%)	1 (0.2%)	0 (0.0%)	
Unknown	87 (21.0%)	67 (15.3%)	79 (15.9%)	72 (14.9%)	

5.4.2 Stenosis Analysis 2023 - 2023

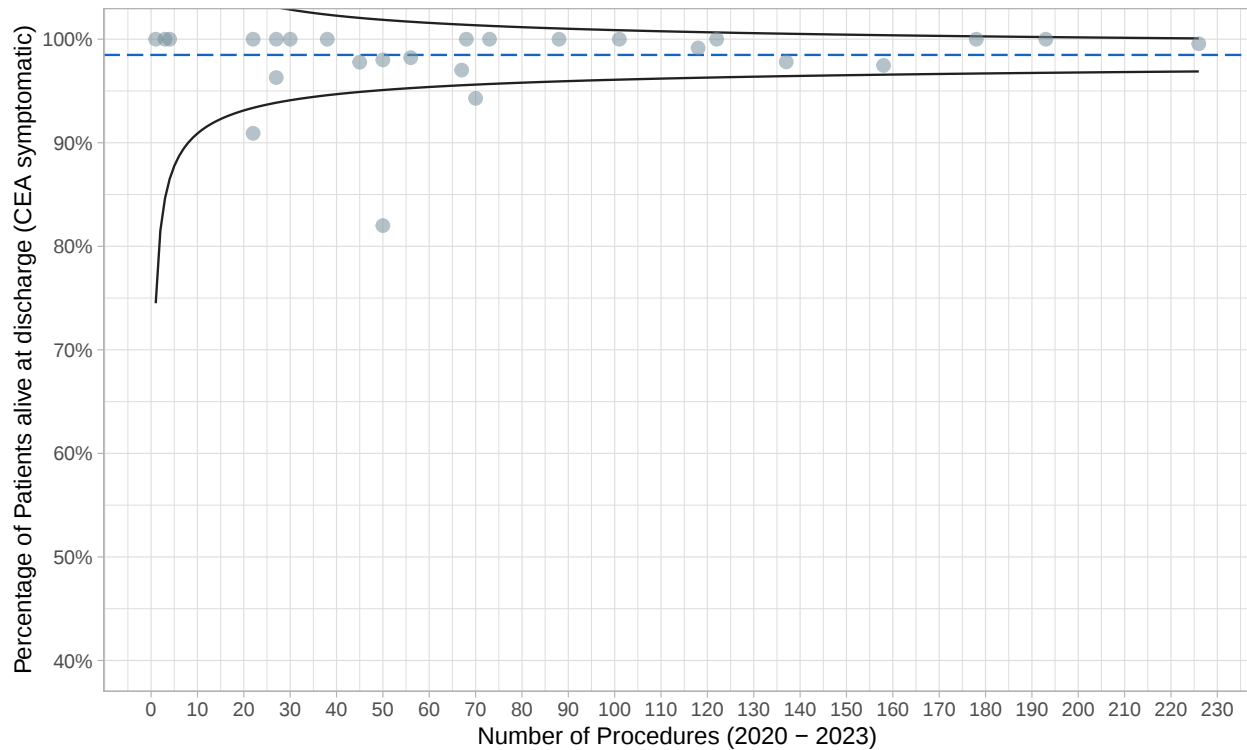
Stenosis information is only available since 1st of January 2023. This analysis excludes patients treated prior to this this date.

Table 18: Stenosis grading (symptomatic)

	2023 (N=700)
NASCET grading	
N-Miss	20
<50%	33 (4.9%)
50-59%	40 (5.9%)
60-69%	76 (11.2%)
70-79%	124 (18.2%)
80-89%	171 (25.1%)
>90%	128 (18.8%)
Near occlusion	19 (2.8%)
Occlusion	37 (5.4%)
No duplex available	43 (6.3%)
No stenosis	9 (1.3%)
Progression of stenosis	
N-Miss	23
Yes	346 (51.1%)
No	331 (48.9%)
Sex	
N-Miss	1
Male	476 (68.1%)
Female	223 (31.9%)
Age (years)	
N-Miss	0
Mean (SD)	73.9 (10.4)
Median (Q1, Q3)	75.0 (68.0, 81.0)

5.4.3 Outcomes at Discharge (CEA symptomatic)

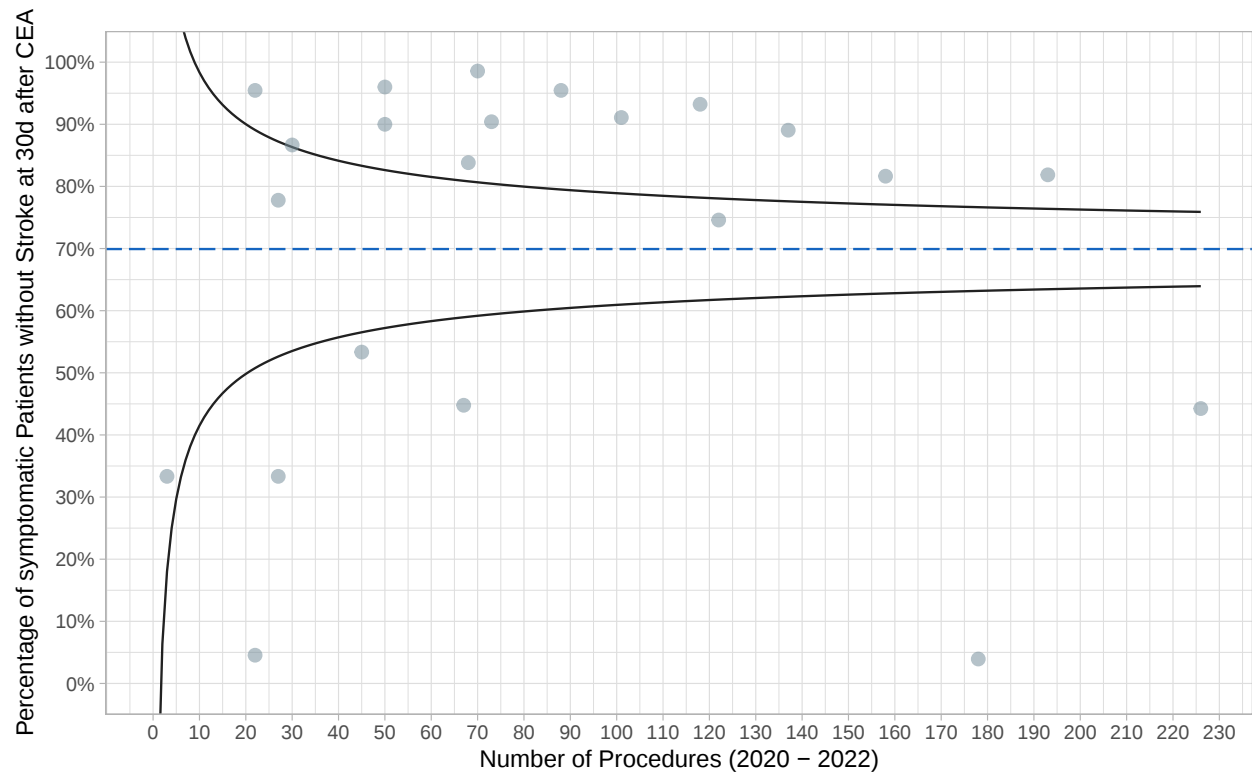
	2020 (N=458)	2021 (N=477)	2022 (N=521)	2023 (N=518)	p value
Inhospital Mortality					< 0.001
Dead	9 (2.0%)	2 (0.4%)	3 (0.6%)	1 (0.2%)	
Alive	436 (95.2%)	474 (99.4%)	517 (99.2%)	517 (99.8%)	
Missing	13 (2.8%)	1 (0.2%)	1 (0.2%)	0 (0.0%)	
Clavien Dindo at Discharge					< 0.001
Grade 0 - No Complication	271 (59.2%)	362 (75.9%)	390 (74.9%)	357 (68.9%)	
Grade I	13 (2.8%)	9 (1.9%)	15 (2.9%)	14 (2.7%)	
Grade I disability	5 (1.1%)	6 (1.3%)	9 (1.7%)	10 (1.9%)	
Grade II	10 (2.2%)	15 (3.1%)	27 (5.2%)	28 (5.4%)	
Grade II disability	3 (0.7%)	3 (0.6%)	4 (0.8%)	5 (1.0%)	
Grade IIIa	7 (1.5%)	4 (0.8%)	3 (0.6%)	3 (0.6%)	
Grade IIIa disability	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)	
Grade IIIb	10 (2.2%)	8 (1.7%)	9 (1.7%)	21 (4.1%)	
Grade IIIb disability	2 (0.4%)	1 (0.2%)	0 (0.0%)	0 (0.0%)	
Grade IVa	4 (0.9%)	1 (0.2%)	2 (0.4%)	4 (0.8%)	
Grade IVa disability	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)	
Grade IVb disability	0 (0.0%)	1 (0.2%)	0 (0.0%)	0 (0.0%)	
Grade V - Death	9 (2.0%)	2 (0.4%)	3 (0.6%)	1 (0.2%)	
Missing	124 (27.1%)	65 (13.6%)	59 (11.3%)	73 (14.1%)	



Note: This plot does NOT show the stroke rate! For stroke rate, see Table above.

5.4.4 Outcomes during Follow-up (CEA symptomatic)

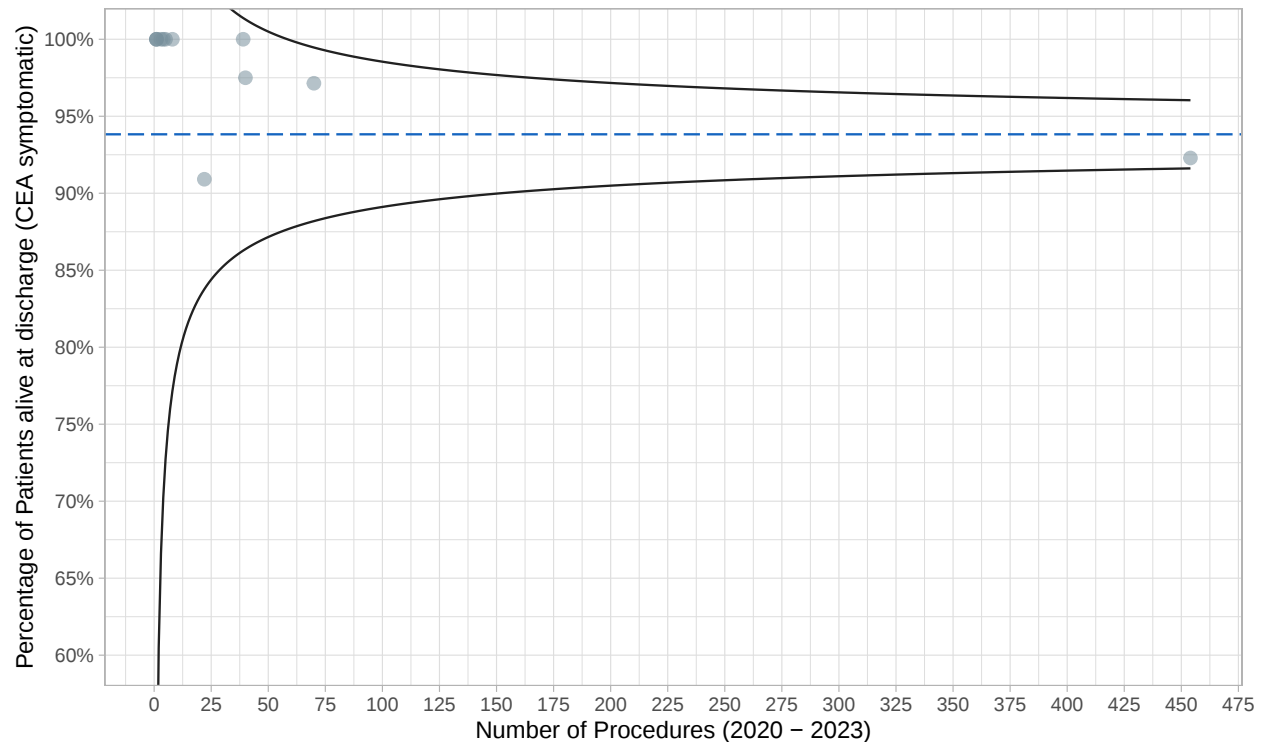
	2020 (N=458)	2021 (N=477)	2022 (N=521)	2023 (N=518)	p value
30d Mortality					0.002
Alive	261 (57.0%)	305 (63.9%)	345 (66.2%)	305 (58.9%)	
Dead	8 (1.7%)	2 (0.4%)	3 (0.6%)	1 (0.2%)	
Missing	189 (41.3%)	170 (35.6%)	173 (33.2%)	212 (40.9%)	
30d Stroke					0.018
Yes	9 (2.0%)	11 (2.3%)	7 (1.3%)	9 (1.7%)	
No	304 (66.4%)	312 (65.4%)	377 (72.4%)	318 (61.4%)	
Missing	145 (31.7%)	154 (32.3%)	137 (26.3%)	191 (36.9%)	



Note: This plot does NOT show the stroke rate! For stroke rate, see Table above.

5.4.5 Outcomes at Discharge (CAS symptomatic)

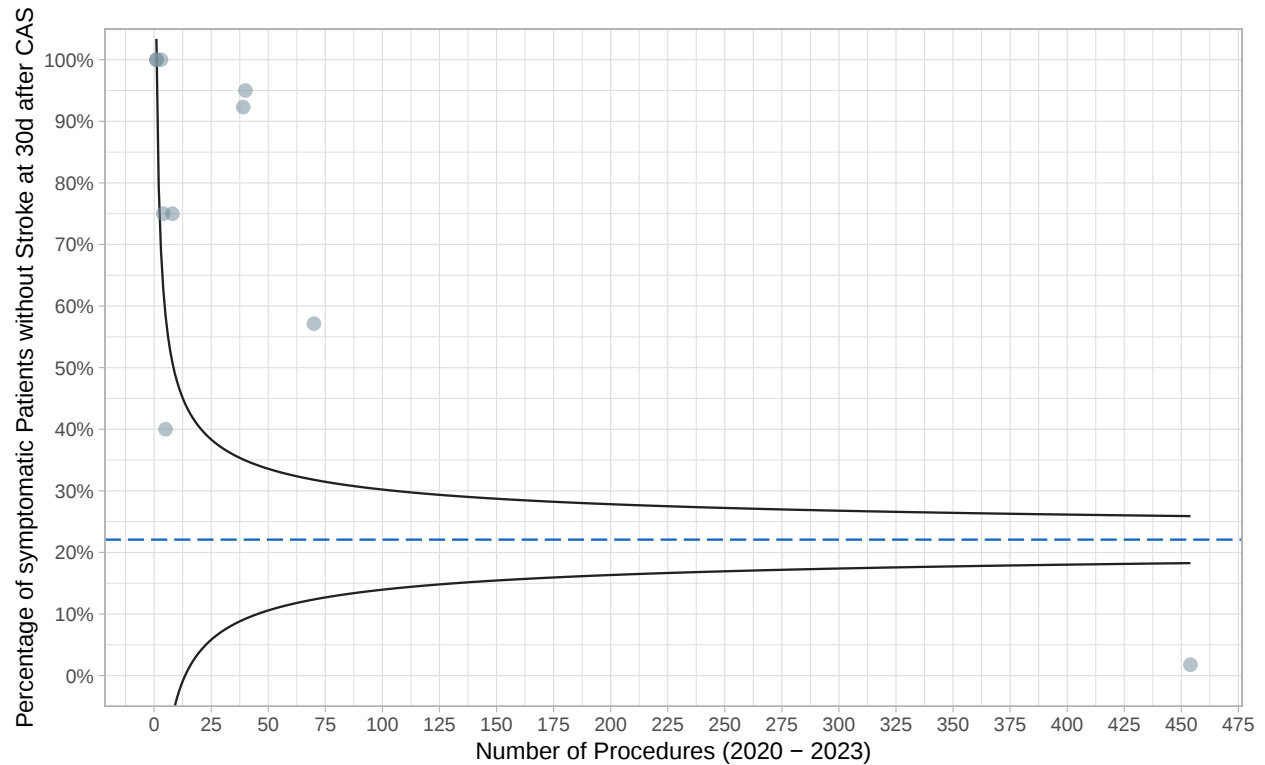
	2020 (N=153)	2021 (N=177)	2022 (N=136)	2023 (N=182)	p value
Inhospital Mortality					0.003
Dead	19 (12.4%)	9 (5.1%)	5 (3.7%)	7 (3.8%)	
Alive	134 (87.6%)	168 (94.9%)	131 (96.3%)	175 (96.2%)	
Clavien Dindo at Discharge					< 0.001
Grade 0 - No Complication	125 (81.7%)	120 (67.8%)	31 (22.8%)	40 (22.0%)	
Grade I	1 (0.7%)	0 (0.0%)	0 (0.0%)	1 (0.5%)	
Grade I disability	1 (0.7%)	1 (0.6%)	1 (0.7%)	0 (0.0%)	
Grade II	3 (2.0%)	0 (0.0%)	1 (0.7%)	4 (2.2%)	
Grade II disability	2 (1.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Grade IIIa	0 (0.0%)	2 (1.1%)	0 (0.0%)	2 (1.1%)	
Grade IIIa disability	0 (0.0%)	0 (0.0%)	1 (0.7%)	0 (0.0%)	
Grade IIIb	1 (0.7%)	1 (0.6%)	0 (0.0%)	1 (0.5%)	
Grade IIIb disability	1 (0.7%)	0 (0.0%)	1 (0.7%)	0 (0.0%)	
Grade IVa	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.5%)	
Grade IVb disability	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.5%)	
Grade V - Death	19 (12.4%)	9 (5.1%)	5 (3.7%)	7 (3.8%)	
Missing	0 (0.0%)	44 (24.9%)	96 (70.6%)	125 (68.7%)	



Note: This plot does NOT show the mortality rate! For mortality rate, see Table above.

5.4.6 Outcomes during Follow-up (CAS symptomatic)

	2020 (N=153)	2021 (N=177)	2022 (N=136)	2023 (N=182)	p value
30d Mortality					< 0.001
Alive	32 (20.9%)	59 (33.3%)	35 (25.7%)	28 (15.4%)	
Dead	19 (12.4%)	9 (5.1%)	5 (3.7%)	7 (3.8%)	
Missing	102 (66.7%)	109 (61.6%)	96 (70.6%)	147 (80.8%)	
30d Stroke					0.067
Yes	3 (2.0%)	2 (1.1%)	1 (0.7%)	3 (1.6%)	
No	37 (24.2%)	47 (26.6%)	30 (22.1%)	24 (13.2%)	
Missing	113 (73.9%)	128 (72.3%)	105 (77.2%)	155 (85.2%)	



Note: This plot does NOT show the stroke rate! For stroke rate, see Table above.

5.5 Asymptomatic Patients

5.5.1 Baseline Characteristics (CEA and CAS)

	2020 (N=244)	2021 (N=276)	2022 (N=294)	2023 (N=328)	p value
Technical Approach					0.001
Open surgery	234 (95.9%)	265 (96.0%)	282 (95.9%)	295 (89.9%)	
Endovascular intervention	10 (4.1%)	11 (4.0%)	12 (4.1%)	33 (10.1%)	
Sex					0.366
Male	163 (66.8%)	188 (68.1%)	205 (69.7%)	240 (73.2%)	
Female	81 (33.2%)	88 (31.9%)	89 (30.3%)	88 (26.8%)	
Age (years)					0.167
N-Miss	0	0	0	0	
Mean (SD)	71.3 (8.5)	72.3 (8.0)	72.8 (7.6)	72.5 (7.9)	
Renal Failure					< 0.001
G1 eGFR > 90	23 (9.4%)	34 (12.3%)	43 (14.6%)	41 (12.5%)	
G2 eGFR 60-89	79 (32.4%)	114 (41.3%)	128 (43.5%)	141 (43.0%)	
G3a eGFR 45-59	30 (12.3%)	30 (10.9%)	38 (12.9%)	36 (11.0%)	
G3b eGFR 30-44	12 (4.9%)	16 (5.8%)	24 (8.2%)	18 (5.5%)	
G4 eGFR 15-29	0 (0.0%)	3 (1.1%)	5 (1.7%)	7 (2.1%)	
G5 eGFR <15 or dialysis	2 (0.8%)	4 (1.4%)	1 (0.3%)	2 (0.6%)	
Unknown	98 (40.2%)	75 (27.2%)	55 (18.7%)	83 (25.3%)	
COPD					0.316
N-Miss	62	47	30	58	
No COPD	133 (73.1%)	176 (76.9%)	186 (70.5%)	201 (74.4%)	
COPD w/o medication	8 (4.4%)	11 (4.8%)	16 (6.1%)	15 (5.6%)	
COPD with medication	11 (6.0%)	3 (1.3%)	13 (4.9%)	14 (5.2%)	
COPD with O2 therapy	1 (0.5%)	3 (1.3%)	0 (0.0%)	1 (0.4%)	
Unknown	29 (15.9%)	36 (15.7%)	49 (18.6%)	39 (14.4%)	
Heart Failure					0.772
N-Miss	62	47	30	59	
No heart failure	119 (65.4%)	143 (62.4%)	175 (66.3%)	164 (61.0%)	
NYHA I	20 (11.0%)	27 (11.8%)	27 (10.2%)	36 (13.4%)	
NYHA II	11 (6.0%)	20 (8.7%)	26 (9.8%)	25 (9.3%)	
NYHA III	3 (1.6%)	6 (2.6%)	6 (2.3%)	3 (1.1%)	
NYHA IV	1 (0.5%)	0 (0.0%)	0 (0.0%)	2 (0.7%)	
Unknown	28 (15.4%)	33 (14.4%)	30 (11.4%)	39 (14.5%)	

5.5.2 Stenosis Analysis 2023 - 2023

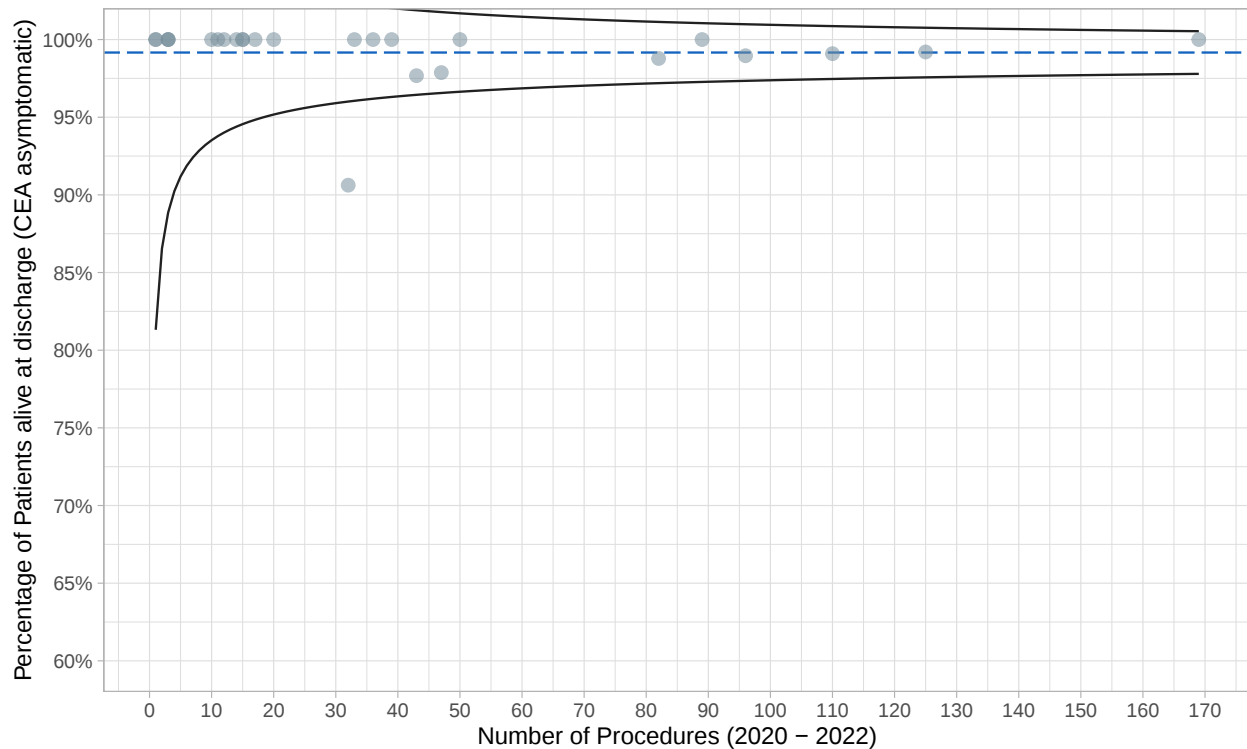
Stenosis information is only available since 1st of January 2023. This analysis excludes patients treated prior to this date.

Table 24: Stenosis grading (asymptomatic)

	2023 (N=328)
NASCET grading	
N-Miss	4
50-59%	3 (0.9%)
60-69%	8 (2.5%)
70-79%	94 (29.0%)
80-89%	150 (46.3%)
>90%	60 (18.5%)
Near occlusion	7 (2.2%)
Occlusion	1 (0.3%)
No stenosis	1 (0.3%)
Progression of stenosis	
N-Miss	4
Yes	234 (72.2%)
No	90 (27.8%)
Sex	
Male	240 (73.2%)
Female	88 (26.8%)
Age (years)	
Mean (SD)	72.5 (7.9)
Median (Q1, Q3)	73.5 (67.0, 79.0)
N-Miss	0

5.5.3 Outcomes at Discharge (CEA asymptomatic)

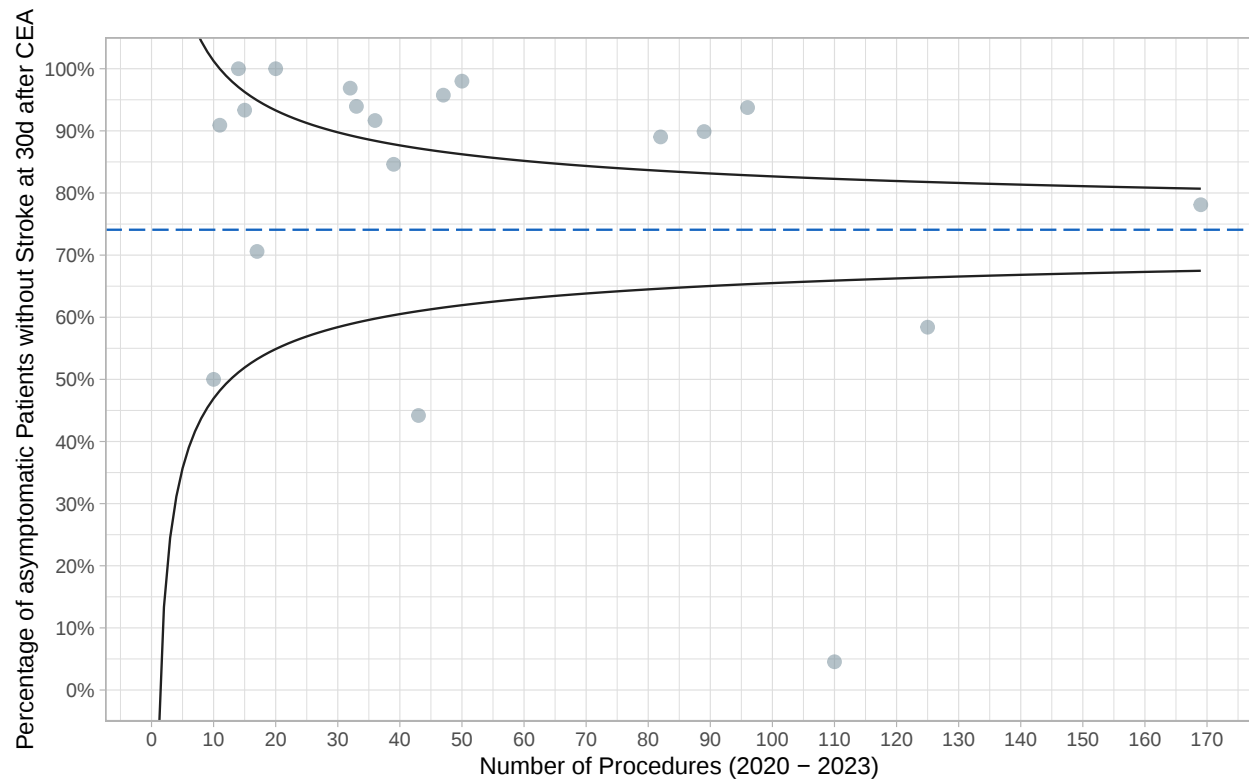
	2020 (N=234)	2021 (N=265)	2022 (N=282)	2023 (N=295)	p value
Inhospital Mortality					0.049
Dead	1 (0.4%)	2 (0.8%)	0 (0.0%)	1 (0.3%)	
Alive	229 (97.9%)	263 (99.2%)	282 (100.0%)	293 (99.3%)	
Missing	4 (1.7%)	0 (0.0%)	0 (0.0%)	1 (0.3%)	
Clavien Dindo at Discharge					0.007
Grade 0 - No Complication	166 (70.9%)	191 (72.1%)	214 (75.9%)	236 (80.0%)	
Grade I	2 (0.9%)	10 (3.8%)	7 (2.5%)	11 (3.7%)	
Grade I disability	3 (1.3%)	5 (1.9%)	4 (1.4%)	3 (1.0%)	
Grade II	3 (1.3%)	8 (3.0%)	15 (5.3%)	7 (2.4%)	
Grade II disability	4 (1.7%)	2 (0.8%)	3 (1.1%)	4 (1.4%)	
Grade IIIa	0 (0.0%)	5 (1.9%)	1 (0.4%)	0 (0.0%)	
Grade IIIb	4 (1.7%)	3 (1.1%)	4 (1.4%)	5 (1.7%)	
Grade IIIb disability	0 (0.0%)	0 (0.0%)	1 (0.4%)	1 (0.3%)	
Grade IVa	0 (0.0%)	1 (0.4%)	0 (0.0%)	2 (0.7%)	
Grade IVa disability	0 (0.0%)	1 (0.4%)	0 (0.0%)	0 (0.0%)	
Grade V - Death	1 (0.4%)	2 (0.8%)	0 (0.0%)	1 (0.3%)	
Missing	51 (21.8%)	37 (14.0%)	33 (11.7%)	25 (8.5%)	



Note: This plot does NOT show the mortality rate! For mortality rate, see Table above.

5.5.4 Outcomes during Follow-up (CEA asymptomatic)

	2020 (N=234)	2021 (N=265)	2022 (N=282)	2023 (N=295)	p value
30d Mortality					0.136
Alive	147 (62.8%)	168 (63.4%)	185 (65.6%)	172 (58.3%)	
Dead	0 (0.0%)	2 (0.8%)	0 (0.0%)	0 (0.0%)	
Missing	87 (37.2%)	95 (35.8%)	97 (34.4%)	123 (41.7%)	
30d Stroke					0.194
Yes	5 (2.1%)	3 (1.1%)	2 (0.7%)	5 (1.7%)	
No	171 (73.1%)	193 (72.8%)	211 (74.8%)	194 (65.8%)	
Missing	58 (24.8%)	69 (26.0%)	69 (24.5%)	96 (32.5%)	



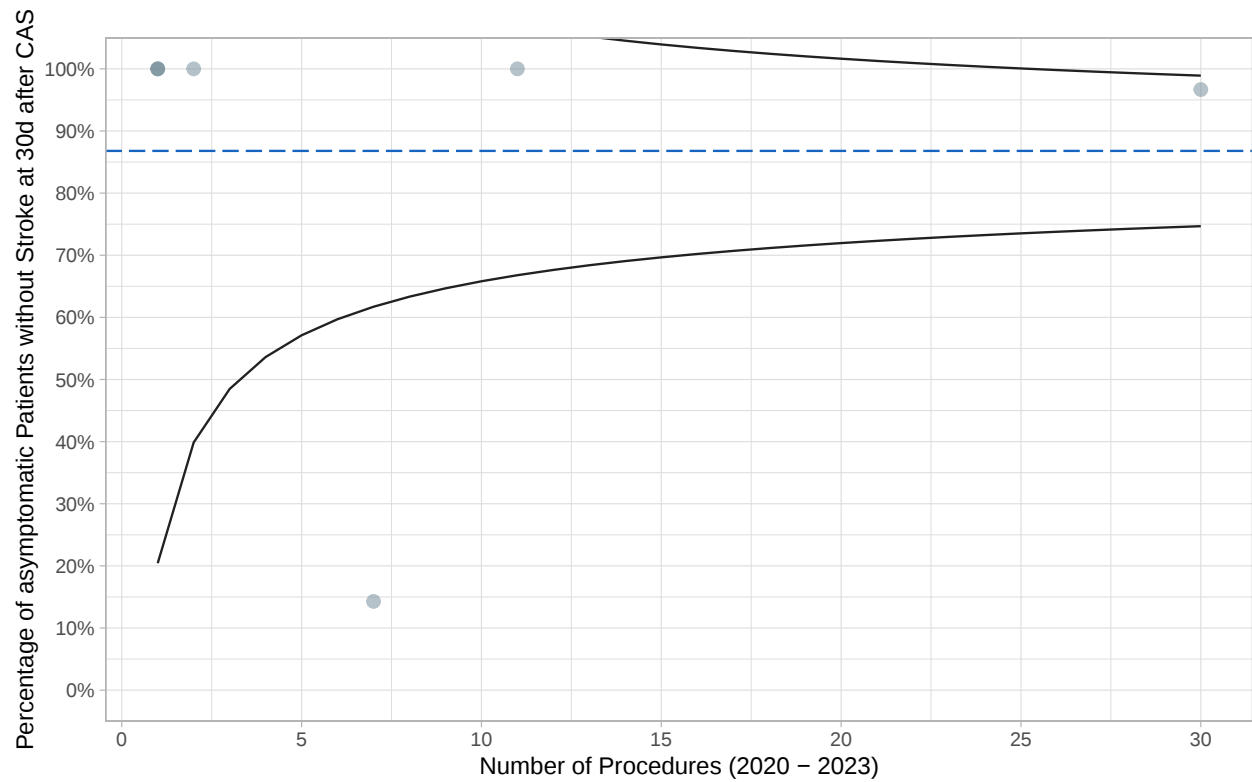
Note: This plot does NOT show the stroke rate! For stroke rate, see Table above.

5.5.5 Outcomes at Discharge (CAS asymptomatic)

	2020 (N=10)	2021 (N=11)	2022 (N=12)	2023 (N=33)	p value
Inhospital Mortality					< 0.001
Alive	10 (100.0%)	11 (100.0%)	12 (100.0%)	33 (100.0%)	
Clavien Dindo at Discharge					0.270
Grade 0 - No Complication	9 (90.0%)	9 (81.8%)	11 (91.7%)	30 (90.9%)	
Grade I	1 (10.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Grade II	0 (0.0%)	0 (0.0%)	1 (8.3%)	0 (0.0%)	
Grade IIIb	0 (0.0%)	1 (9.1%)	0 (0.0%)	0 (0.0%)	
Grade IVa	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.0%)	
Missing	0 (0.0%)	1 (9.1%)	0 (0.0%)	2 (6.1%)	

5.5.6 Outcomes during Follow-up (CAS asymptomatic)

	2020 (N=10)	2021 (N=11)	2022 (N=12)	2023 (N=33)	p value
30d Mortality					0.495
Alive	7 (70.0%)	9 (81.8%)	10 (83.3%)	21 (63.6%)	
Missing	3 (30.0%)	2 (18.2%)	2 (16.7%)	12 (36.4%)	
30d Stroke					0.398
Yes	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.0%)	
No	7 (70.0%)	9 (81.8%)	11 (91.7%)	19 (57.6%)	
Missing	3 (30.0%)	2 (18.2%)	1 (8.3%)	13 (39.4%)	



Note: This plot does NOT show the stroke rate! For stroke rate, see Table above.

6 Bypass Surgery for Femoro-Popliteal Occlusive Disease

This cohort includes patients with open procedure at the native femoro-popliteal (supragenicular, infragenicular, or isolated popliteal) segment for obstructing wall pathology or intraluminal obstruction. Only sterile procedures, only procedures with no previous intervention at the same location, and only patients with chronic ischemia (both critical and relative).

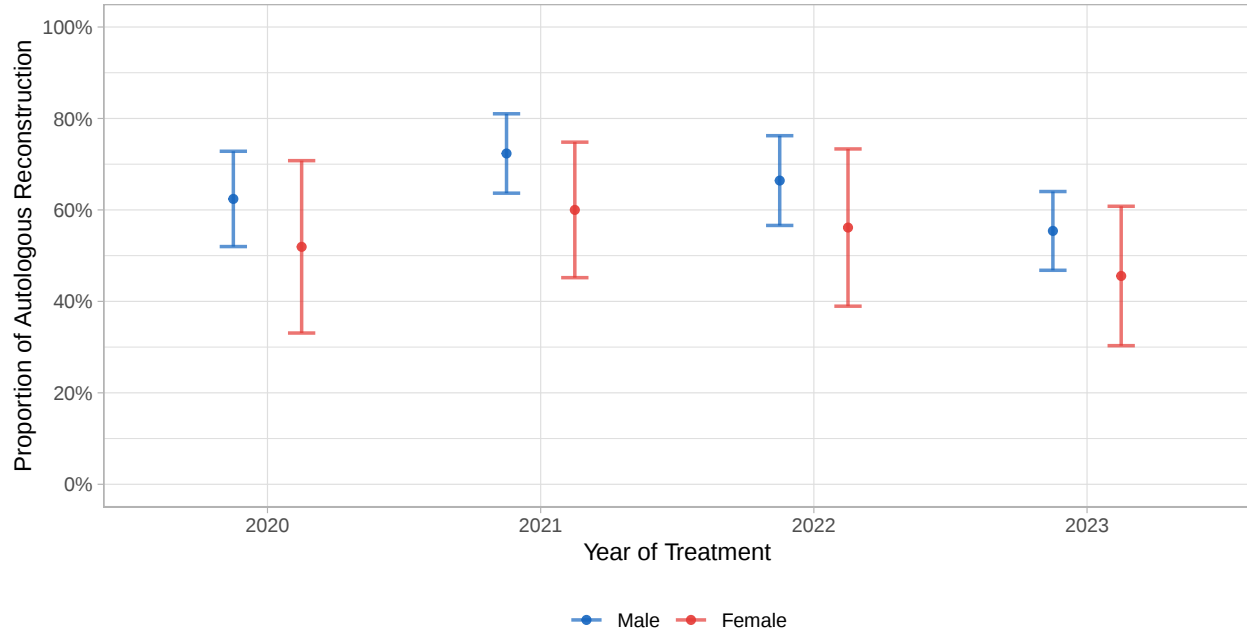
6.1 Baseline Characteristics

	2020 (N=185)	2021 (N=211)	2022 (N=191)	2023 (N=321)	p value
Sex					0.599
Male	133 (71.9%)	141 (66.8%)	134 (70.2%)	231 (72.0%)	
Female	52 (28.1%)	70 (33.2%)	57 (29.8%)	90 (28.0%)	
Age (years)					0.714
N-Miss	0	0	0	0	
Mean (SD)	71.5 (11.4)	71.5 (10.4)	72.0 (10.0)	72.4 (10.3)	
Renal Failure					0.004
G1 eGFR > 90	31 (16.8%)	38 (18.0%)	36 (18.8%)	61 (19.0%)	
G2 eGFR 60-89	38 (20.5%)	61 (28.9%)	61 (31.9%)	87 (27.1%)	
G3a eGFR 45-59	12 (6.5%)	24 (11.4%)	19 (9.9%)	37 (11.5%)	
G3b eGFR 30-44	9 (4.9%)	7 (3.3%)	8 (4.2%)	28 (8.7%)	
G4 eGFR 15-29	3 (1.6%)	4 (1.9%)	10 (5.2%)	8 (2.5%)	
G5 eGFR <15 or dialysis	1 (0.5%)	2 (0.9%)	2 (1.0%)	3 (0.9%)	
Unknown	91 (49.2%)	75 (35.5%)	55 (28.8%)	97 (30.2%)	
COPD					0.523
N-Miss	63	63	39	71	
No COPD	82 (67.2%)	87 (58.8%)	87 (57.2%)	158 (63.2%)	
COPD w/o medication	12 (9.8%)	12 (8.1%)	14 (9.2%)	23 (9.2%)	
COPD with medication	7 (5.7%)	13 (8.8%)	12 (7.9%)	25 (10.0%)	
COPD with O2 therapy	0 (0.0%)	0 (0.0%)	1 (0.7%)	0 (0.0%)	
Unknown	21 (17.2%)	36 (24.3%)	38 (25.0%)	44 (17.6%)	
Heart Failure					0.325
N-Miss	63	63	39	71	
No heart failure	79 (64.8%)	80 (54.1%)	74 (48.7%)	156 (62.4%)	
NYHA I	9 (7.4%)	12 (8.1%)	15 (9.9%)	18 (7.2%)	
NYHA II	4 (3.3%)	9 (6.1%)	14 (9.2%)	20 (8.0%)	
NYHA III	5 (4.1%)	5 (3.4%)	9 (5.9%)	8 (3.2%)	
NYHA IV	2 (1.6%)	2 (1.4%)	1 (0.7%)	2 (0.8%)	
Unknown	23 (18.9%)	40 (27.0%)	39 (25.7%)	46 (18.4%)	

6.2 Treatment Details

	2020 (N=185)	2021 (N=211)	2022 (N=191)	2023 (N=321)	p value
Segment					0.354
Fem-pop, supragenicular	92 (49.7%)	96 (45.5%)	98 (51.3%)	180 (56.1%)	
Fem-pop, infragenicular	88 (47.6%)	110 (52.1%)	90 (47.1%)	136 (42.4%)	
Isolated popliteal	5 (2.7%)	5 (2.4%)	3 (1.6%)	5 (1.6%)	
Clinical Problem					0.013
Chronic relative ischemia	79 (42.7%)	95 (45.0%)	97 (50.8%)	180 (56.1%)	
Chronic critical ischemia	106 (57.3%)	116 (55.0%)	94 (49.2%)	141 (43.9%)	
Material					0.002
Autologous	110 (59.5%)	144 (68.2%)	121 (63.4%)	169 (52.6%)	
Biological	7 (3.8%)	15 (7.1%)	8 (4.2%)	15 (4.7%)	
Synthetic	68 (36.8%)	52 (24.6%)	62 (32.5%)	137 (42.7%)	

6.2.1 Proportion of autologous reconstructions



6.3 Critical Limb Ischemia

To increase comparability, the cohort was defined as follows: Open or endovascular procedure at the native femoro-popliteal (supragenicular or infragenicular) segment for obstructing wall pathology or intraluminal obstruction. Only sterile procedures, only procedures with no previous intervention at the same location, and only patients with chronic critical ischemia.

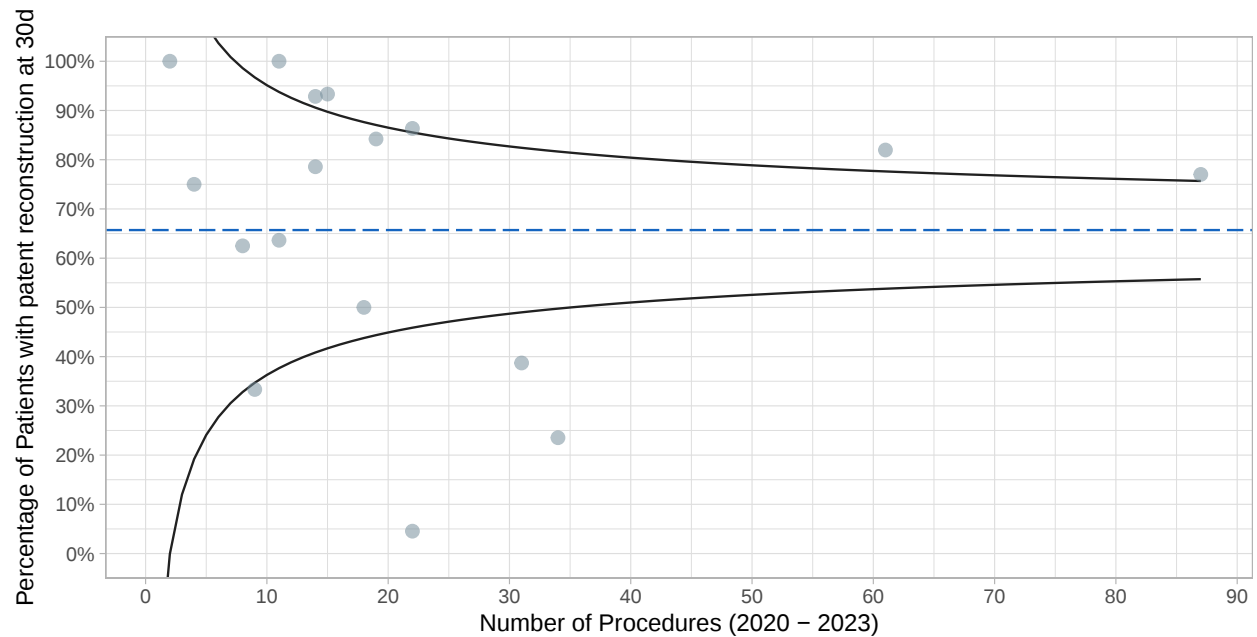
6.3.1 Characteristics and Hospital Outcomes

Table 31: Revascularisation for Critical Limb Ischemia

	2020 (N=106)	2021 (N=116)	2022 (N=94)	2023 (N=141)	p value
Segment					0.305
Fem-pop, supragenicular	45 (42.5%)	36 (31.0%)	40 (42.6%)	55 (39.0%)	
Fem-pop, infragenicular	59 (55.7%)	80 (69.0%)	53 (56.4%)	83 (58.9%)	
Isolated popliteal	2 (1.9%)	0 (0.0%)	1 (1.1%)	3 (2.1%)	
Material					0.253
Autologous	58 (54.7%)	81 (69.8%)	64 (68.1%)	86 (61.0%)	
Biological	6 (5.7%)	7 (6.0%)	5 (5.3%)	10 (7.1%)	
Synthetic	42 (39.6%)	28 (24.1%)	25 (26.6%)	45 (31.9%)	
Inhospital Mortality					0.664
Dead	3 (2.8%)	6 (5.2%)	3 (3.2%)	8 (5.7%)	
Alive	100 (94.3%)	109 (94.0%)	90 (95.7%)	132 (93.6%)	
Missing	3 (2.8%)	1 (0.9%)	1 (1.1%)	1 (0.7%)	
Clavien Dindo at Discharge					0.042
Grade 0 - No Complication	55 (51.9%)	64 (55.2%)	41 (43.6%)	69 (48.9%)	
Grade I	8 (7.5%)	0 (0.0%)	2 (2.1%)	3 (2.1%)	
Grade II	5 (4.7%)	6 (5.2%)	12 (12.8%)	17 (12.1%)	
Grade II disability	1 (0.9%)	1 (0.9%)	0 (0.0%)	2 (1.4%)	
Grade IIIa	1 (0.9%)	2 (1.7%)	1 (1.1%)	6 (4.3%)	
Grade IIIa disability	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.7%)	
Grade IIIb	8 (7.5%)	12 (10.3%)	14 (14.9%)	11 (7.8%)	
Grade IIIb disability	1 (0.9%)	1 (0.9%)	4 (4.3%)	0 (0.0%)	
Grade IVa	1 (0.9%)	2 (1.7%)	3 (3.2%)	2 (1.4%)	
Grade IVa disability	1 (0.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Grade V - Death	3 (2.8%)	6 (5.2%)	3 (3.2%)	8 (5.7%)	
Missing	22 (20.8%)	22 (19.0%)	14 (14.9%)	22 (15.6%)	

6.3.2 Outcomes during Follow-up

	2020 (N=106)	2021 (N=116)	2022 (N=94)	2023 (N=141)	p value
30d Mortality					0.223
Alive	74 (69.8%)	76 (65.5%)	69 (73.4%)	82 (58.2%)	
Dead	3 (2.8%)	6 (5.2%)	2 (2.1%)	5 (3.5%)	
Missing	29 (27.4%)	34 (29.3%)	23 (24.5%)	54 (38.3%)	
30d Reconstruction patency					0.071
Yes	54 (50.9%)	64 (55.2%)	62 (66.0%)	71 (50.4%)	
No	6 (5.7%)	1 (0.9%)	1 (1.1%)	4 (2.8%)	
Missing	46 (43.4%)	51 (44.0%)	31 (33.0%)	66 (46.8%)	



Note: This plot does NOT show the occlusion rate! For occlusion rate, see Table above.

6.4 Chronic Relative Ischemia (Claudication)

To increase comparability, the cohort was defined as follows: Open or endovascular procedure at the native femoro-popliteal (supragenicular or infragenicular) segment for obstructing wall pathology or intraluminal obstruction. Only sterile procedures, only procedures with no previous intervention at the same location, and only patients with chronic relative ischemia.

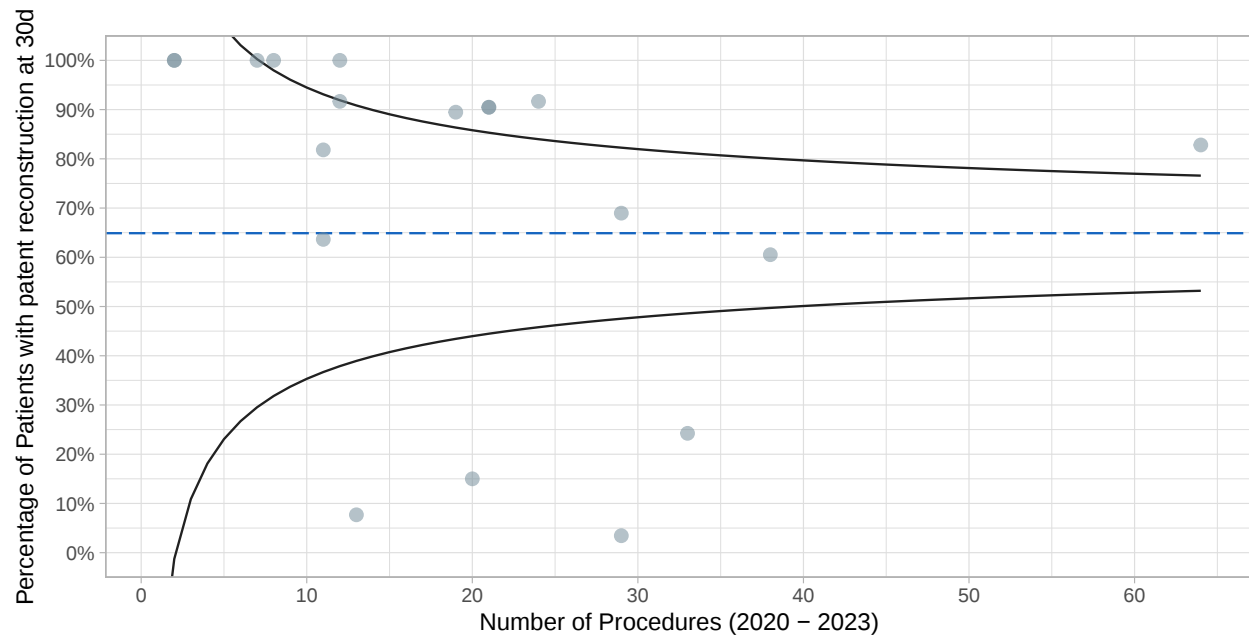
6.4.1 Characteristics and Hospital Outcomes

Table 33: Revascularisation for Claudication

	2020 (N=79)	2021 (N=95)	2022 (N=97)	2023 (N=180)	p value
Segment					0.256
Fem-pop, supragenicular	47 (59.5%)	60 (63.2%)	58 (59.8%)	125 (69.4%)	
Fem-pop, infragenicular	29 (36.7%)	30 (31.6%)	37 (38.1%)	53 (29.4%)	
Isolated popliteal	3 (3.8%)	5 (5.3%)	2 (2.1%)	2 (1.1%)	
Material					< 0.001
Autologous	52 (65.8%)	63 (66.3%)	57 (58.8%)	83 (46.1%)	
Biological	1 (1.3%)	8 (8.4%)	3 (3.1%)	5 (2.8%)	
Synthetic	26 (32.9%)	24 (25.3%)	37 (38.1%)	92 (51.1%)	
Inhospital Mortality					0.377
Dead	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.6%)	
Alive	76 (96.2%)	93 (97.9%)	97 (100.0%)	171 (95.0%)	
Missing	3 (3.8%)	2 (2.1%)	0 (0.0%)	8 (4.4%)	
Clavien Dindo at Discharge					0.195
Grade 0 - No Complication	45 (57.0%)	58 (61.1%)	48 (49.5%)	114 (63.3%)	
Grade I	3 (3.8%)	2 (2.1%)	4 (4.1%)	3 (1.7%)	
Grade I disability	0 (0.0%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	
Grade II	1 (1.3%)	8 (8.4%)	5 (5.2%)	4 (2.2%)	
Grade II disability	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.6%)	
Grade IIIa	2 (2.5%)	1 (1.1%)	0 (0.0%)	0 (0.0%)	
Grade IIIb	3 (3.8%)	4 (4.2%)	7 (7.2%)	5 (2.8%)	
Grade V - Death	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.6%)	
Missing	25 (31.6%)	22 (23.2%)	32 (33.0%)	52 (28.9%)	

6.4.2 Outcomes during Follow-up

	2020 (N=79)	2021 (N=95)	2022 (N=97)	2023 (N=180)	p value
30d Mortality					0.166
Alive	45 (57.0%)	62 (65.3%)	59 (60.8%)	88 (48.9%)	
Dead	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.6%)	
Missing	34 (43.0%)	33 (34.7%)	38 (39.2%)	91 (50.6%)	
30d Reconstruction patency					0.037
Yes	36 (45.6%)	61 (64.2%)	58 (59.8%)	89 (49.4%)	
No	2 (2.5%)	3 (3.2%)	1 (1.0%)	1 (0.6%)	
Missing	41 (51.9%)	31 (32.6%)	38 (39.2%)	90 (50.0%)	



Note: This plot does NOT show the occlusion rate! For occlusion rate, see Table above.

7 Appendix I

7.1 Missing Data in the AAA Cohort

Missing in AAA Cohort – Overall

