

SwissVasc Overall Annual Report 2020

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 (2020 versus 2019) 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 Kruskal-Wallis rank 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 1.4.1103 (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 10.15.7, all p-values are two-sided.

1.2 SwissVasc Dataexport

Date of export for interventions in 2020: 30/07/2021

Date of export for interventions in 2019: 08/02/2021

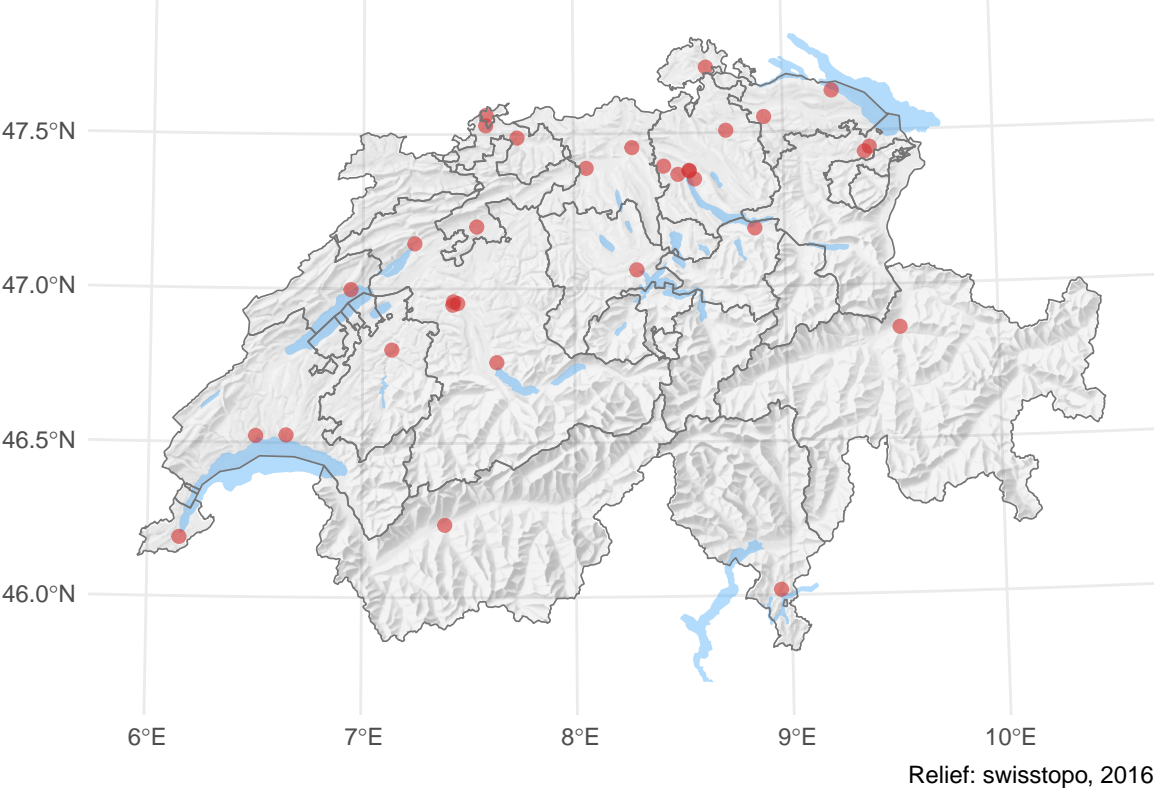
1.3 Use of Figures and Tables

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1.4 Errors

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

2 Participating Hospitals 2020

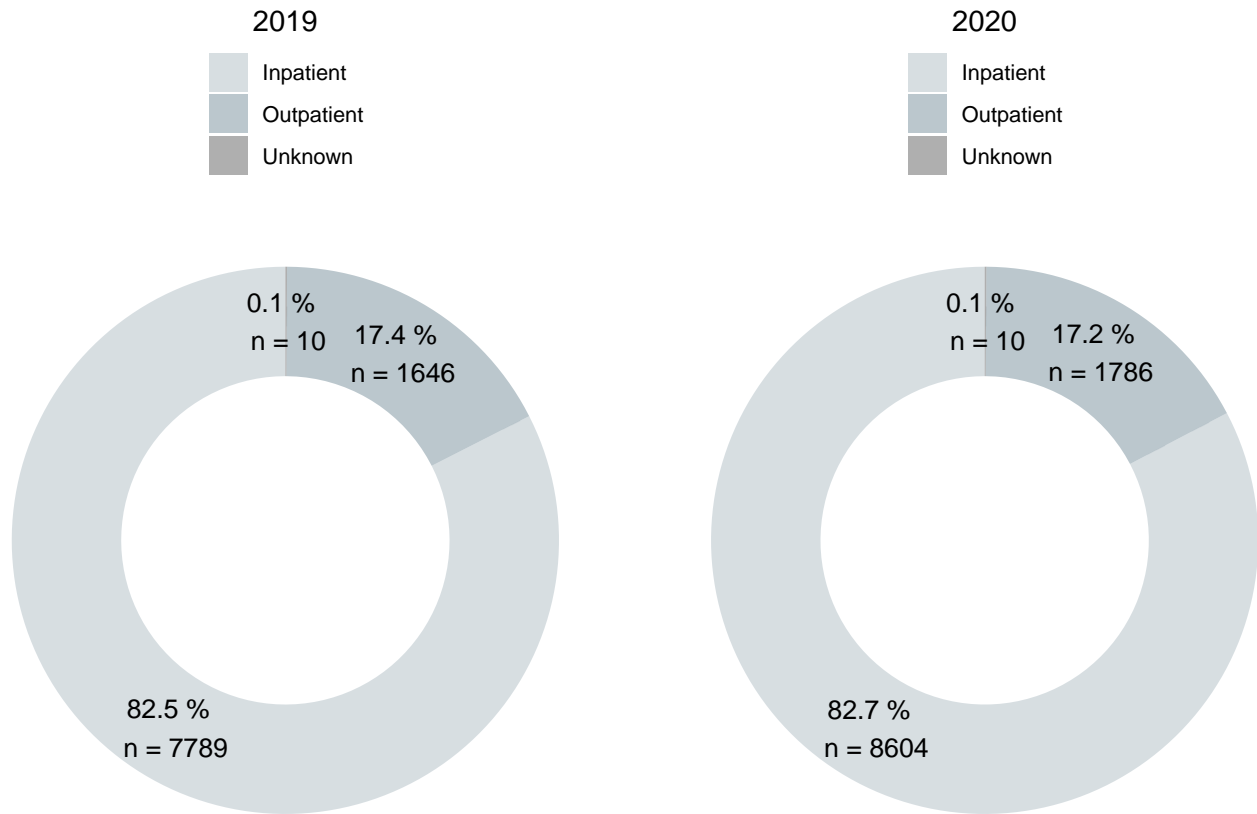


3 All Interventions

Table 1: General Overview

Year	2019	2020
Cases	4764	5766
Patients	7293	7783
Operationen	9445	10400
Inpatient Operationen	7789	8604
Outpatient Operationen	1646	1786
Procedures	11881	13200

3.1 Inpatient versus Outpatient Surgery



4 Overview of Vascular Interventions

Table 2: Overview on Vascular Procedures

Year	2019	2020
Cases	2950	3594
Patients	4817	5305
Operationen	5571	6252
Inpatient Operationen	5251	5943
Outpatient Operationen	313	302
Procedures	6658	7648

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

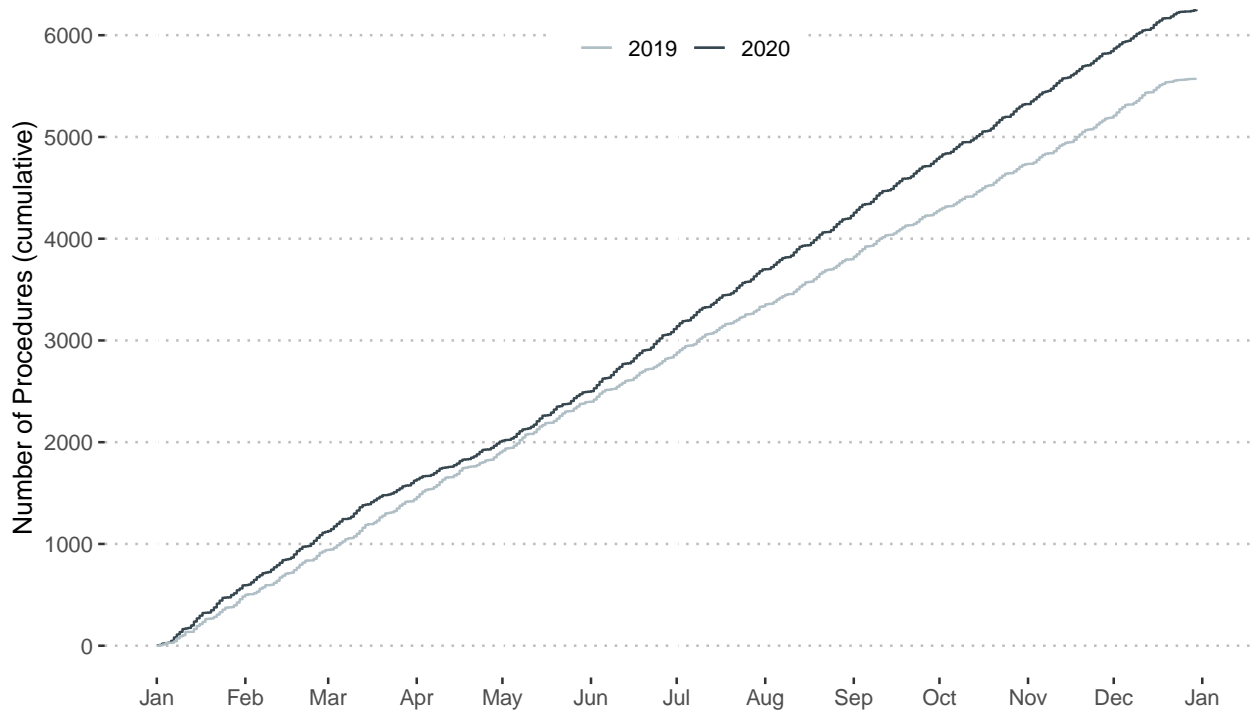


Table 3: Details of Vascular Procedures

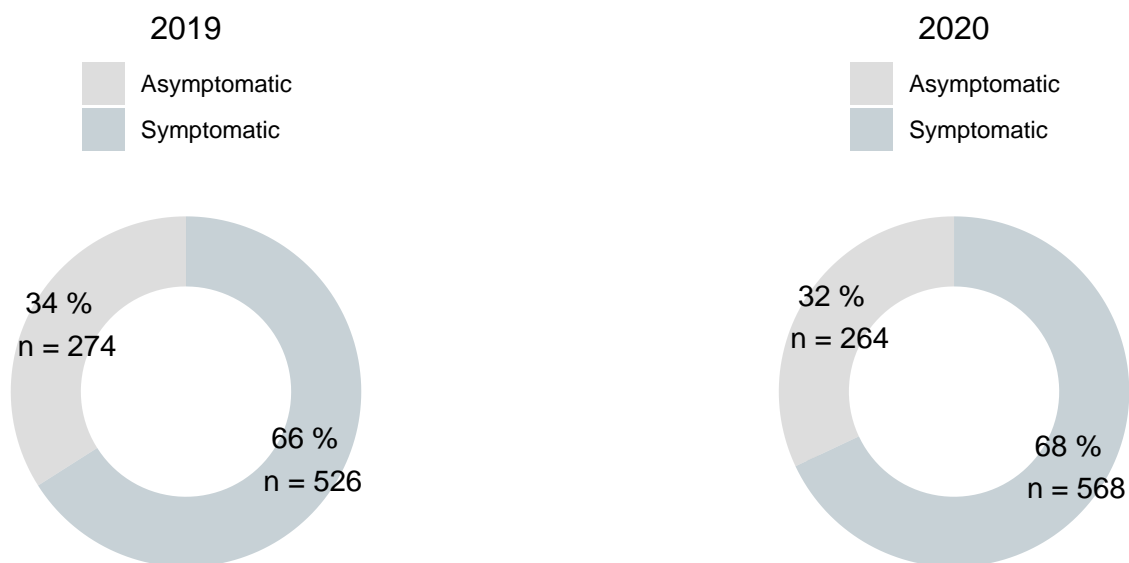
	2019 (N=5571)	2020 (N=6252)	p value
Urgency			< 0.001
Elective	3685 (66.1%)	4049 (64.8%)	
Urgent	776 (13.9%)	1164 (18.6%)	
Emergency	1094 (19.6%)	1030 (16.5%)	
Missing	16 (0.3%)	9 (0.1%)	
Length of Stay			0.095
Median	7.0	6.0	
Q1, Q3	3.0, 12.0	3.0, 11.0	
Previous interventions			0.001
N-Miss	23	21	
No previous intervention at the same location	4368 (78.7%)	4784 (76.8%)	
Planned consecutive intervention	275 (5.0%)	407 (6.5%)	
Revision within 30d - inhouse complications	248 (4.5%)	311 (5.0%)	
Revision within 30d - extern complications	59 (1.1%)	49 (0.8%)	
Redo	598 (10.8%)	680 (10.9%)	
Approach			0.846
Open surgery	4049 (72.7%)	4534 (72.5%)	
Endovascular intervention	1522 (27.3%)	1718 (27.5%)	
Hybrid			< 0.001
N-Miss	564	1922	
Same Approach	146 (2.9%)	172 (4.0%)	
Isolated Procedure	4649 (92.9%)	3867 (89.3%)	
Hybrid Approach	212 (4.2%)	291 (6.7%)	
Sterility			0.631
N-Miss	18	7	
Infected or presumably infected	132 (2.4%)	157 (2.5%)	
Sterile operation	5421 (97.6%)	6088 (97.5%)	
Sex			0.772
N-Miss	2	4	
Male	3986 (71.6%)	4487 (71.8%)	
Female	1583 (28.4%)	1761 (28.2%)	
Age (years)			0.742
N-Miss	1	1	
Median	72.0	72.0	
Q1, Q3	64.0, 79.0	64.0, 79.0	

5 Treatment of the supraaortic Arteries

5.1 Treatment of Carotid Stenosis (CEA & CAS)

Table 4: Endarterectomy and Stenting of the Carotid Bifurcation

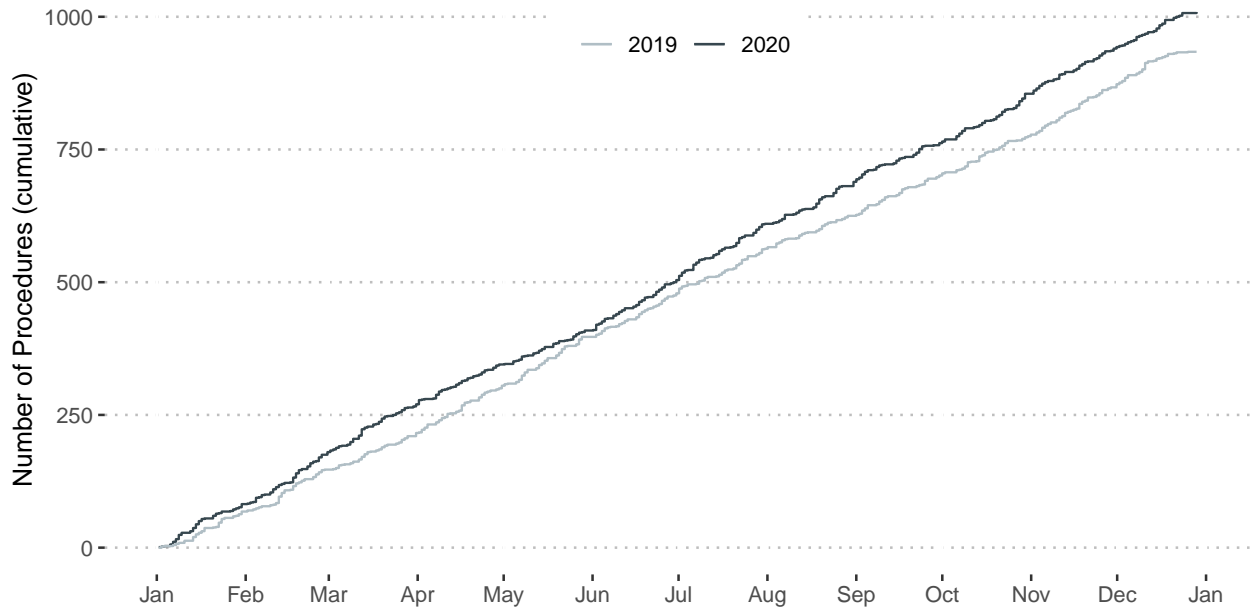
	2019 (N=800)	2020 (N=832)	p value
Approach			0.120
Open surgery	667 (83.4%)	669 (80.4%)	
Endovascular intervention	133 (16.6%)	163 (19.6%)	
Clinical Problem			0.279
Asymptomatic	274 (34.2%)	264 (31.7%)	
Symptomatic	526 (65.8%)	568 (68.3%)	
Inflow Optimisation			0.406
N-Miss	27	181	
Same Approach	2 (0.3%)	3 (0.5%)	
Hybrid Approach	1 (0.1%)	3 (0.5%)	
No Inflow Optimization	770 (99.6%)	645 (99.1%)	
Sex			0.937
Male	563 (70.4%)	587 (70.6%)	
Female	237 (29.6%)	245 (29.4%)	
Age (years)			0.848
N-Miss	1	0	
Mean (SD)	72.8 (8.8)	72.8 (9.6)	
Range	33.0 - 97.0	24.0 - 95.0	



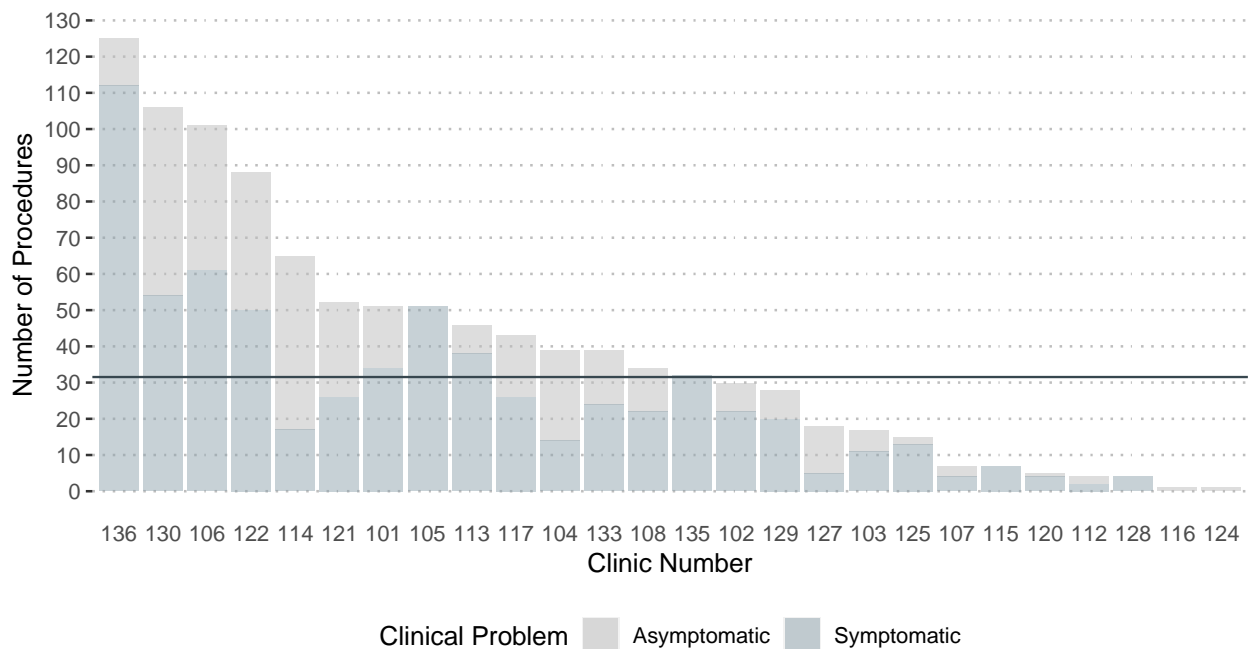
5.2 Other Interventions on Supraaortic Arteries in 2020

- 11 procedures for glomus tumors or other tumors affecting the carotid arteries.
- 12 procedures for thoracic outlet syndrome.
- 19 procedures for debranching or rebranching of supraaortic arteries.
- 24 procedures for symptomatic occlusion of the subclavian artery or the brachiocephalic trunk.
- 111 other procedures on supraaortic arteries.

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



5.4 Treatment of Supraaortic Arteries in 2020 - National Overview



6 Treatment of Arteries of the Upper Extremity

Table 5: Surgery for Acute Ischemia of the Upper Extremity

	2019 (N=68)	2020 (N=81)	p value
Vascular Intervention			0.858
N-Miss	1	0	
Vascular graft	5 (7.5%)	7 (8.6%)	
Bifurcated graft	0 (0.0%)	1 (1.2%)	
Complex bifurcated graft (Y + branches)	1 (1.5%)	0 (0.0%)	
Repair of vessel wall	3 (4.5%)	3 (3.7%)	
Isolated dilatation (PTA/Stent)	6 (9.0%)	8 (9.9%)	
Mural desobliteration w/wo patch	3 (4.5%)	4 (4.9%)	
Luminal desobliteration (e.g. embolectomy)	46 (68.7%)	56 (69.1%)	
Fenestration (only in dissections)	1 (1.5%)	0 (0.0%)	
Therapeutic occlusion of vessels	1 (1.5%)	1 (1.2%)	
Resection of av-malform	1 (1.5%)	0 (0.0%)	
Imaging	0 (0.0%)	1 (1.2%)	
Sex			0.071
Male	22 (32.4%)	38 (46.9%)	
Female	46 (67.6%)	43 (53.1%)	
Age (years)			0.322
Mean (SD)	69.5 (18.9)	72.3 (15.3)	
Range	17.0 - 94.0	33.0 - 96.0	

Table 6: Surgery for Vascular Wall Injury and Pseudoaneurysms

	2019 (N=14)	2020 (N=16)	p value
Clinical Problem			0.740
No problem	2 (14.3%)	3 (18.8%)	
Bleeding	10 (71.4%)	12 (75.0%)	
Local swelling, inflammation or displacement	1 (7.1%)	1 (6.2%)	
Chronic relative ischemia	1 (7.1%)	0 (0.0%)	
Sterility			0.022
Infected or presumably infected	4 (28.6%)	0 (0.0%)	
Sterile operation	10 (71.4%)	16 (100.0%)	
Sex			0.491
Male	7 (50.0%)	10 (62.5%)	
Female	7 (50.0%)	6 (37.5%)	

	2019 (N=14)	2020 (N=16)	p value
Age (years)			0.384
Mean (SD)	58.6 (23.8)	65.6 (19.0)	
Range	20.0 - 95.0	30.0 - 88.0	

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 7: Other Interventions on Upper Extremity Arteries

	2019 (N=30)	2020 (N=48)	p value
Clinical Problem			0.538
No problem	15 (50.0%)	20 (41.7%)	
Bleeding	0 (0.0%)	3 (6.2%)	
Local swelling, inflammation or displacement	2 (6.7%)	6 (12.5%)	
Chronic relative ischemia	10 (33.3%)	13 (27.1%)	
Chronic critical ischemia	3 (10.0%)	6 (12.5%)	
Sterility			0.426
Infected or presumably infected	0 (0.0%)	1 (2.1%)	
Sterile operation	30 (100.0%)	47 (97.9%)	
Sex			0.420
Male	22 (73.3%)	31 (64.6%)	
Female	8 (26.7%)	17 (35.4%)	
Age (years)			0.486
Mean (SD)	67.5 (13.7)	65.1 (14.6)	
Range	24.0 - 89.0	31.0 - 87.0	

7 Surgery of the Abdominal Aorta and the Iliac Arteries

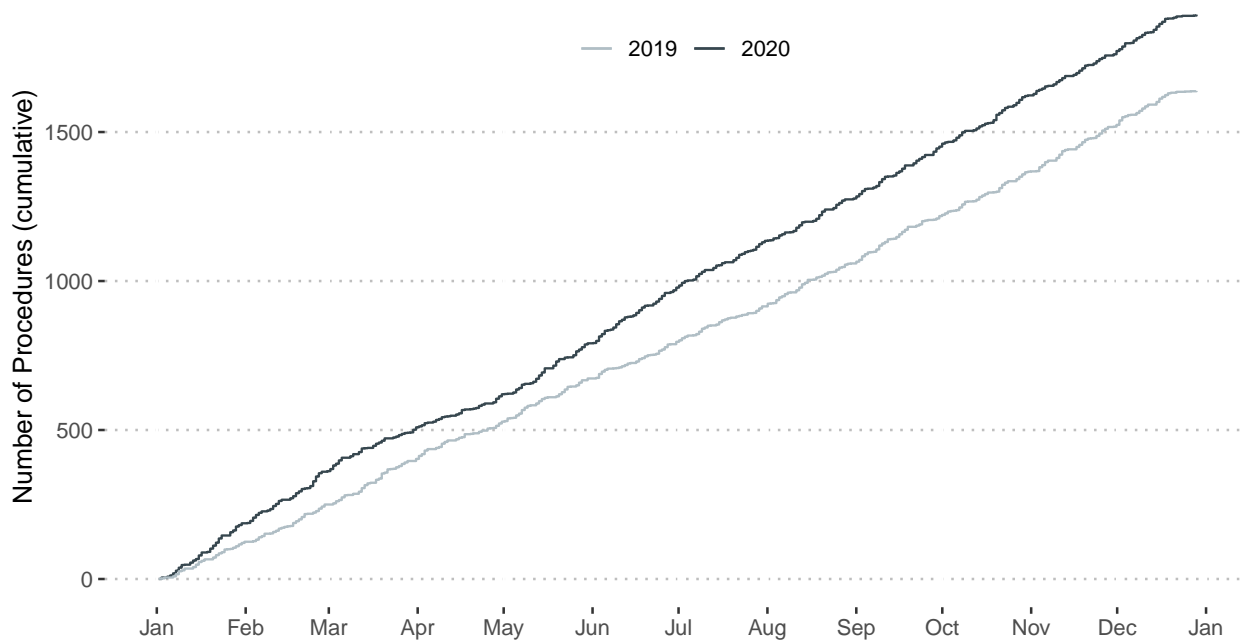
7.1 Overview

Table 8: Overview - Abdominal Aorta and Iliac Arteries

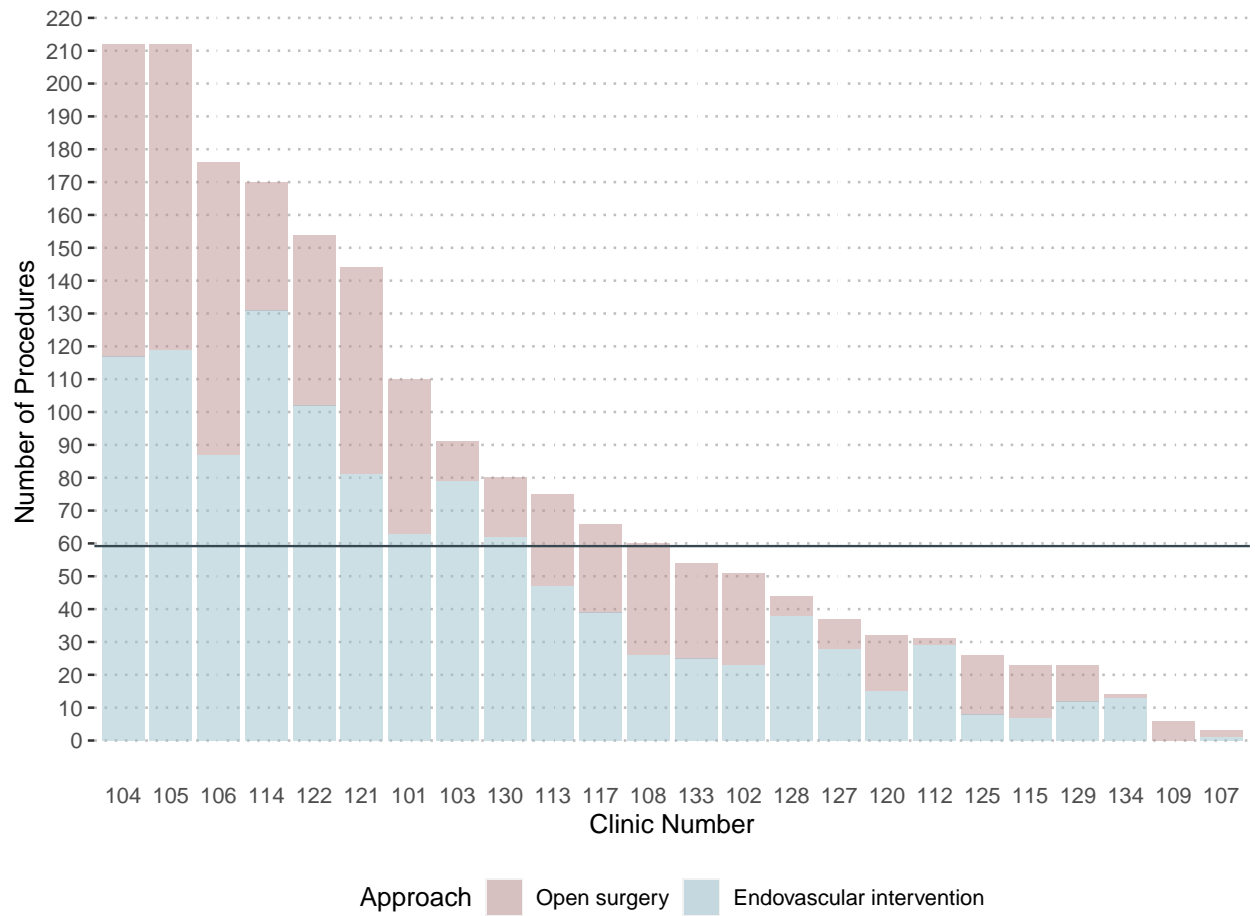
	2019 (N=1638)	2020 (N=1894)	p value
Segment			< 0.001
Thoracoabdominal Crawford 4	26 (1.6%)	139 (7.3%)	
Aorto-iliac including suprarenal segment	218 (13.3%)	217 (11.5%)	
Aorto-iliac including infrarenal segment	896 (54.7%)	955 (50.4%)	
Isolated iliac arteries	498 (30.4%)	583 (30.8%)	
Approach			0.001
Open surgery	730 (44.6%)	742 (39.2%)	
Endovascular intervention	908 (55.4%)	1152 (60.8%)	
Pathology			< 0.001
N-Miss	0	1	
No vascular pathology	28 (1.7%)	40 (2.1%)	
Vascular wall injury / pseudoaneurysm	41 (2.5%)	99 (5.2%)	
Aneurysm (true)	987 (60.3%)	1073 (56.7%)	
Inflammatory aneurysm (sterile)	9 (0.5%)	11 (0.6%)	
Dissection without aneurysm formation	15 (0.9%)	22 (1.2%)	
Dissection with aneurysm formation	12 (0.7%)	16 (0.8%)	
Obstruction intraluminally	86 (5.3%)	112 (5.9%)	
Obstruction wall pathology	410 (25.0%)	464 (24.5%)	
Obstruction by external compression	6 (0.4%)	4 (0.2%)	
AV-malformation	1 (0.1%)	1 (0.1%)	
No vascular pathology / vascular access or diagnostic procedures)	8 (0.5%)	0 (0.0%)	
Source of emboli w/o pathology of the vessel wall	3 (0.2%)	0 (0.0%)	
Tumor	2 (0.1%)	5 (0.3%)	
Endoleak	30 (1.8%)	46 (2.4%)	
Clinical Problem			< 0.001
N-Miss	0	2	
No problem	874 (53.4%)	814 (43.0%)	
Symptomatic	165 (10.1%)	307 (16.2%)	
Bleeding	93 (5.7%)	143 (7.6%)	

	2019 (N=1638)	2020 (N=1894)	p value
Local swelling, inflammation or displacement	17 (1.0%)	33 (1.7%)	
Pathologic AV-fistula	2 (0.1%)	2 (0.1%)	
Acute Ischemia	49 (3.0%)	66 (3.5%)	
Distal embolisation	3 (0.2%)	9 (0.5%)	
Chronic relative ischemia	289 (17.6%)	350 (18.5%)	
Chronic critical ischemia	146 (8.9%)	167 (8.8%)	
Chronic venous insufficiency	0 (0.0%)	1 (0.1%)	
Sex			0.933
N-Miss	0	1	
Male	1329 (81.1%)	1538 (81.2%)	
Female	309 (18.9%)	355 (18.8%)	
Age (years)			0.318
N-Miss	0	1	
Mean (SD)	71.5 (10.1)	71.1 (10.4)	
Range	0.0 - 96.0	8.0 - 98.0	

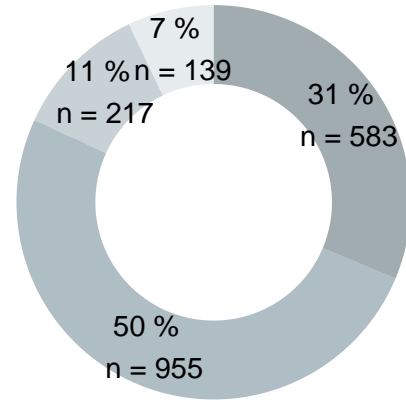
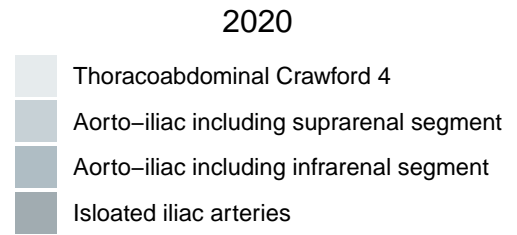
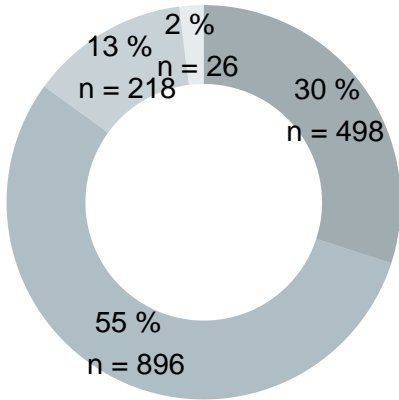
7.1.1 Treatment of the Abdominal Aorta and the Iliac Arteries - Year-on-Year Change



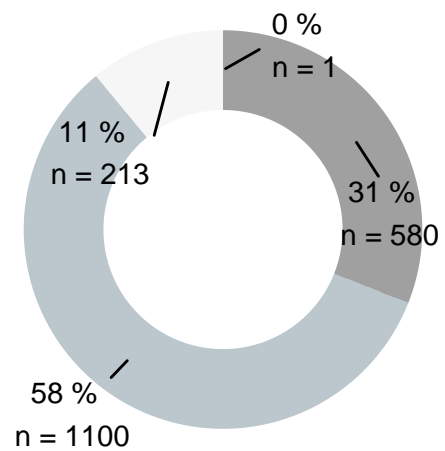
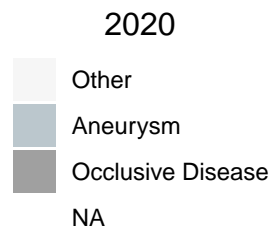
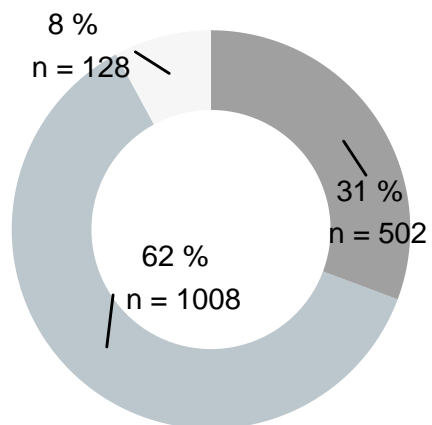
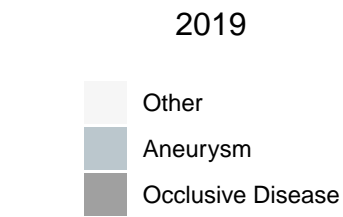
7.1.2 Treatment of the Abdominal Aorta and the Iliac Arteries in 2020 - National Overview



7.1.3 Treated Segments



7.1.4 Treated Pathologies



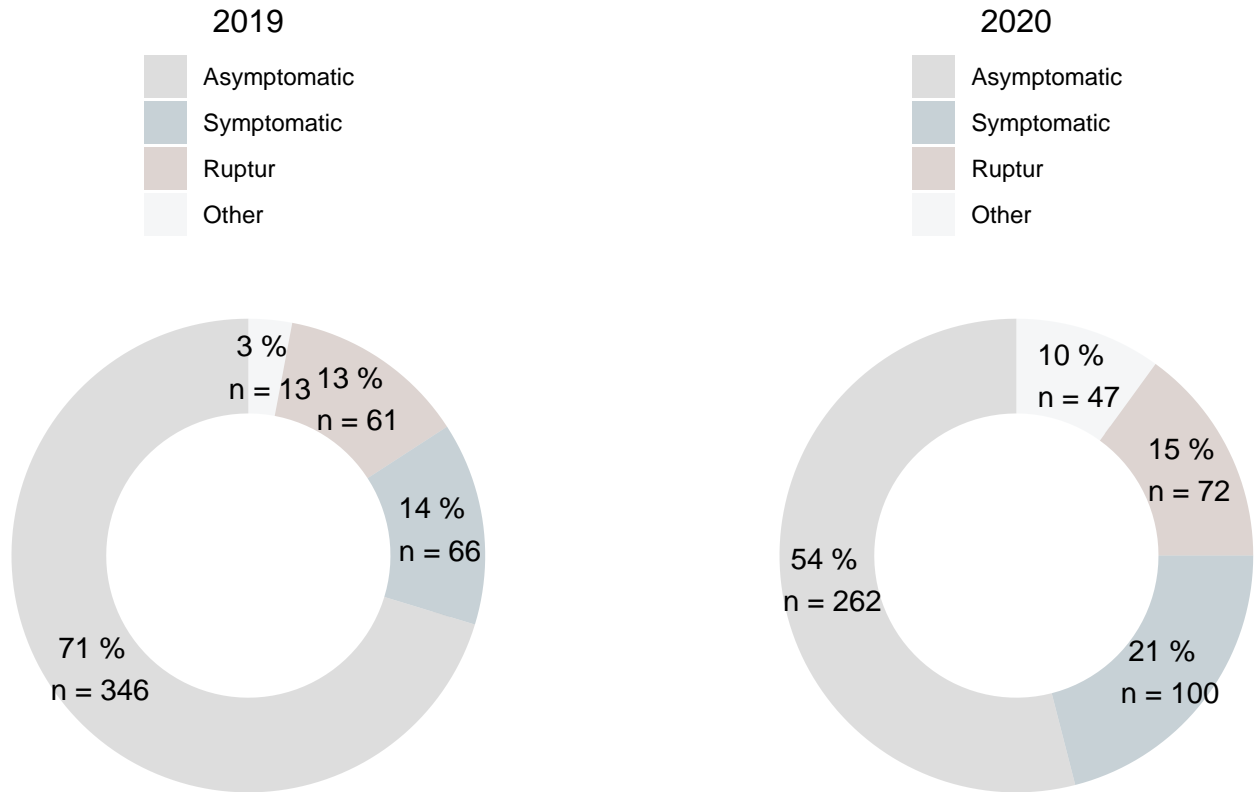
7.2 Open Repair for Aneurysms of the Abdominal Aorta and the Iliac Arteries

Table 9: OR for AAA and Iliac Aneurysms

	2019 (N=486)	2020 (N=481)	p value
Segment			0.102
Thoracoabdominal Crawford 4	7 (1.4%)	12 (2.5%)	
Aorto-iliac including suprarenal segment	146 (30.0%)	136 (28.3%)	
Aorto-iliac including infrarenal segment	310 (63.8%)	294 (61.1%)	
Isolated iliac arteries	23 (4.7%)	39 (8.1%)	
Pathology			0.001
Vascular wall injury / pseudoaneurysm	17 (3.5%)	46 (9.6%)	
Aneurysm (true)	455 (93.6%)	417 (86.7%)	
Inflammatory aneurysm (sterile)	4 (0.8%)	7 (1.5%)	
Dissection with aneurysm formation	10 (2.1%)	11 (2.3%)	
Clinical Problem			< 0.001
No problem	346 (71.2%)	262 (54.5%)	
Symptomatic	66 (13.6%)	100 (20.8%)	
Bleeding	61 (12.6%)	72 (15.0%)	
Local swelling, inflammation or displacement	10 (2.1%)	15 (3.1%)	
Pathologic AV-fistula	0 (0.0%)	1 (0.2%)	
Acute Ischemia	1 (0.2%)	6 (1.2%)	
Distal embolisation	0 (0.0%)	1 (0.2%)	
Chronic relative ischemia	2 (0.4%)	17 (3.5%)	
Chronic critical ischemia	0 (0.0%)	7 (1.5%)	
Vascular Intervention			0.013
N-Miss	8	0	
Vascular graft	134 (28.0%)	160 (33.3%)	
Bifurcated graft	234 (49.0%)	203 (42.2%)	
Complex bifurcated graft (Y + branches)	87 (18.2%)	65 (13.5%)	
Repair of vessel wall	3 (0.6%)	15 (3.1%)	
Isolated dilatation (PTA/Stent)	3 (0.6%)	7 (1.5%)	
Mural desobliteration w/wo patch	4 (0.8%)	5 (1.0%)	
Luminal desobliteration (e.g. embolectomy)	3 (0.6%)	7 (1.5%)	
Fenestration (only in dissections)	1 (0.2%)	1 (0.2%)	
Sealing	3 (0.6%)	4 (0.8%)	
Therapeutic occlusion of vessels	1 (0.2%)	2 (0.4%)	
Resection of av-malform	0 (0.0%)	6 (1.2%)	
Isolated phlebectomy	0 (0.0%)	1 (0.2%)	

	2019 (N=486)	2020 (N=481)	p value
De-/rebranching	4 (0.8%)	3 (0.6%)	
Imaging	1 (0.2%)	2 (0.4%)	
Sterility			0.063
N-Miss	5	1	
Infected or presumably infected	10 (2.1%)	20 (4.2%)	
Sterile operation	471 (97.9%)	460 (95.8%)	
Previous interventions			0.047
N-Miss	6	1	
No previous intervention at the same location	426 (88.8%)	417 (86.9%)	
Planned consecutive intervention	9 (1.9%)	24 (5.0%)	
Revision within 30d - inhouse complications	5 (1.0%)	9 (1.9%)	
Revision within 30d - extern complications	3 (0.6%)	3 (0.6%)	
Redo	37 (7.7%)	27 (5.6%)	
Conversion			0.548
N-Miss	54	96	
No Conversion	409 (94.7%)	368 (95.6%)	
Conversion	23 (5.3%)	17 (4.4%)	
Sex			0.953
Male	429 (88.3%)	424 (88.1%)	
Female	57 (11.7%)	57 (11.9%)	
Age (years)			0.172
Mean (SD)	70.9 (8.9)	70.0 (10.4)	
Range	19.0 - 94.0	11.0 - 95.0	

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



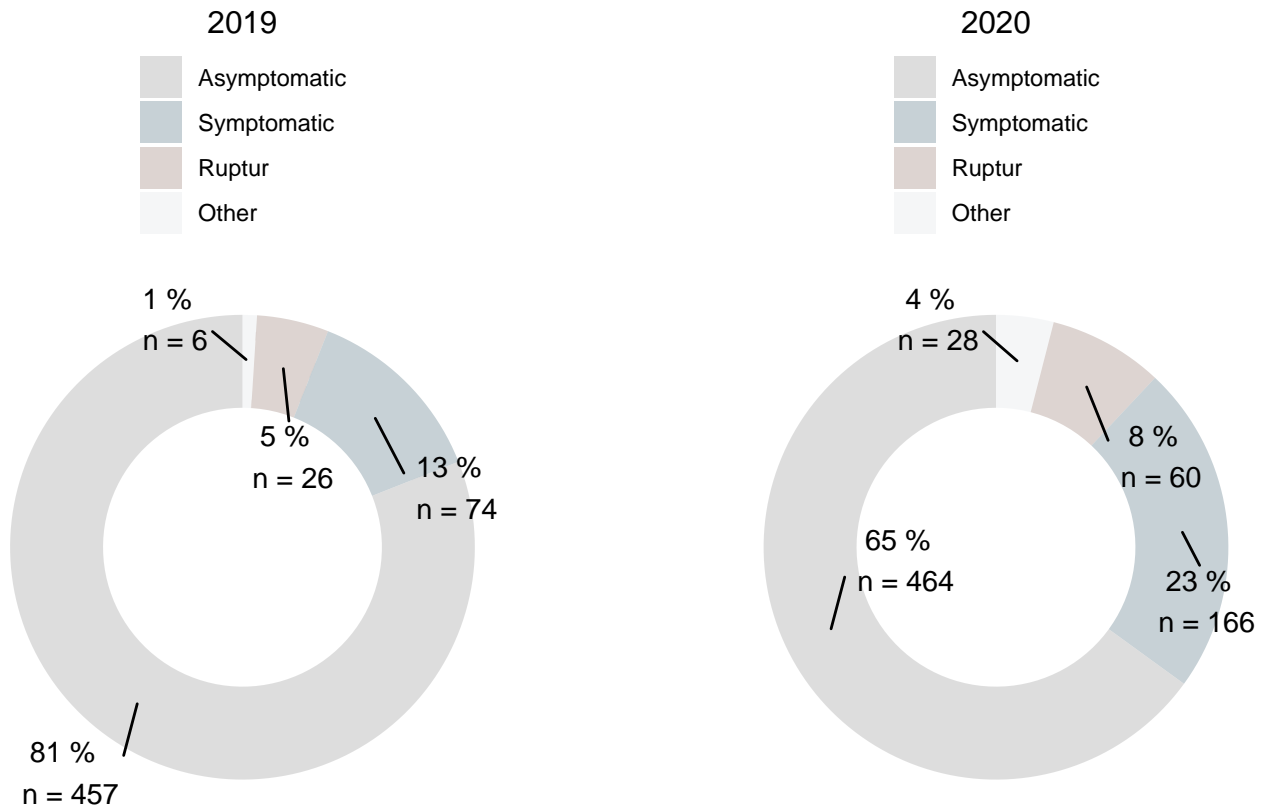
7.3 Endovascular Repair for Aneurysms of the Abdominal Aorta and the Iliac Arteries

Table 10: Endovascular Repair for AAA and Iliac Aneurysms

	2019 (N=563)	2020 (N=718)	p value
Segment			< 0.001
Thoracoabdominal Crawford 4	16 (2.8%)	120 (16.7%)	
Aorto-iliac including suprarenal segment	31 (5.5%)	42 (5.8%)	
Aorto-iliac including infrarenal segment	421 (74.8%)	452 (63.0%)	
Isolated iliac arteries	95 (16.9%)	104 (14.5%)	
Pathology			0.086
Vascular wall injury / pseudoaneurysm	24 (4.3%)	53 (7.4%)	
Aneurysm (true)	532 (94.5%)	656 (91.4%)	
Inflammatory aneurysm (sterile)	5 (0.9%)	4 (0.6%)	
Dissection with aneurysm formation	2 (0.4%)	5 (0.7%)	
Clinical Problem			< 0.001
No problem	457 (81.2%)	464 (64.6%)	
Symptomatic	74 (13.1%)	166 (23.1%)	
Bleeding	26 (4.6%)	60 (8.4%)	
Local swelling, inflammation or displacement	1 (0.2%)	7 (1.0%)	
Pathologic AV-fistula	1 (0.2%)	1 (0.1%)	
Acute Ischemia	1 (0.2%)	2 (0.3%)	
Distal embolisation	0 (0.0%)	4 (0.6%)	
Chronic relative ischemia	3 (0.5%)	12 (1.7%)	
Chronic critical ischemia	0 (0.0%)	2 (0.3%)	
Vascular Intervention			< 0.001
N-Miss	63	1	
Vascular graft	81 (16.2%)	171 (23.8%)	
Bifurcated graft	346 (69.2%)	408 (56.9%)	
Complex bifurcated graft (Y + branches)	30 (6.0%)	67 (9.3%)	
Repair of vessel wall	7 (1.4%)	3 (0.4%)	
Isolated dilatation (PTA/Stent)	23 (4.6%)	34 (4.7%)	
Mural desobliteration w/wo patch	0 (0.0%)	2 (0.3%)	
Sealing	12 (2.4%)	26 (3.6%)	
Therapeutic occlusion of vessels	1 (0.2%)	5 (0.7%)	
De-/rebranching	0 (0.0%)	1 (0.1%)	
Material			0.147
Synthetic Material for Vessel wall	473 (84.0%)	591 (82.3%)	
Coils, Plugs, etc	9 (1.6%)	24 (3.3%)	

	2019 (N=563)	2020 (N=718)	p value
No material	81 (14.4%)	103 (14.3%)	
Sterility			0.760
N-Miss	3	0	
Infected or presumably infected	3 (0.5%)	3 (0.4%)	
Sterile operation	557 (99.5%)	715 (99.6%)	
Previous interventions			0.023
N-Miss	5	2	
No previous intervention at the same location	486 (87.1%)	652 (91.1%)	
Planned consecutive intervention	25 (4.5%)	22 (3.1%)	
Revision within 30d - inhouse complications	2 (0.4%)	9 (1.3%)	
Revision within 30d - extern complications	1 (0.2%)	1 (0.1%)	
Redo	44 (7.9%)	32 (4.5%)	
Conversion			0.634
N-Miss	92	122	
No Conversion	463 (98.3%)	588 (98.7%)	
Conversion	8 (1.7%)	8 (1.3%)	
Sex			0.672
Male	493 (87.6%)	623 (86.8%)	
Female	70 (12.4%)	95 (13.2%)	
Age (years)			0.153
Mean (SD)	75.4 (8.6)	74.8 (8.2)	
Range	0.0 - 96.0	49.0 - 98.0	

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 11: OR for Aortoiliac Occlusive Disease

	2019 (N=223)	2020 (N=225)	p value
Segment			0.677
Thoracoabdominal Crawford 4	2 (0.9%)	2 (0.9%)	
Aorto-iliac including suprarenal segment	23 (10.3%)	21 (9.3%)	
Aorto-iliac including infrarenal segment	108 (48.4%)	122 (54.2%)	
Isolated iliac arteries	90 (40.4%)	80 (35.6%)	
Pathology			0.574
Dissection without aneurysm formation	6 (2.7%)	6 (2.7%)	
Obstruction intraluminally	64 (28.7%)	78 (34.7%)	
Obstruction wall pathology	150 (67.3%)	139 (61.8%)	
Obstruction by external compression	3 (1.3%)	2 (0.9%)	
Clinical Problem			0.608
N-Miss	0	1	
No problem	6 (2.7%)	8 (3.6%)	
Symptomatic	8 (3.6%)	9 (4.0%)	
Bleeding	0 (0.0%)	2 (0.9%)	
Local swelling, inflammation or displacement	1 (0.4%)	3 (1.3%)	
Pathologic AV-fistula	1 (0.4%)	0 (0.0%)	
Acute Ischemia	25 (11.2%)	23 (10.3%)	
Distal embolisation	1 (0.4%)	1 (0.4%)	
Chronic relative ischemia	102 (45.7%)	113 (50.4%)	
Chronic critical ischemia	79 (35.4%)	65 (29.0%)	
Vascular Intervention			0.206
N-Miss	1	0	
Vascular graft	48 (21.6%)	56 (24.9%)	
Bifurcated graft	60 (27.0%)	65 (28.9%)	
Complex bifurcated graft (Y + branches)	34 (15.3%)	34 (15.1%)	
Isolated dilatation (PTA/Stent)	29 (13.1%)	13 (5.8%)	
Mural desobliteration w/wo patch	37 (16.7%)	36 (16.0%)	
Luminal desobliteration (e.g. embolectomy)	13 (5.9%)	18 (8.0%)	
Fenestration (only in dissections)	1 (0.5%)	1 (0.4%)	
Therapeutic occlusion of vessels	0 (0.0%)	2 (0.9%)	
Material			0.191
Autologous Material Only	4 (1.8%)	2 (0.9%)	
Biological Material	24 (10.8%)	32 (14.2%)	

	2019 (N=223)	2020 (N=225)	p value
Synthetic Material for Vessel wall	143 (64.1%)	153 (68.0%)	
Coils, Plugs, etc	1 (0.4%)	3 (1.3%)	
No material	51 (22.9%)	35 (15.6%)	
Sterility			0.368
Infected or presumably infected	4 (1.8%)	7 (3.1%)	
Sterile operation	219 (98.2%)	218 (96.9%)	
Previous interventions			0.751
No previous intervention at the same location	178 (79.8%)	174 (77.3%)	
Planned consecutive intervention	8 (3.6%)	9 (4.0%)	
Revision within 30d - inhouse complications	6 (2.7%)	11 (4.9%)	
Revision within 30d - extern complications	2 (0.9%)	1 (0.4%)	
Redo	29 (13.0%)	30 (13.3%)	
Conversion			0.004
N-Miss	45	31	
No Conversion	173 (97.2%)	174 (89.7%)	
Conversion	5 (2.8%)	20 (10.3%)	
Sex			0.030
Male	138 (61.9%)	161 (71.6%)	
Female	85 (38.1%)	64 (28.4%)	
Age (years)			0.057
Mean (SD)	66.3 (11.5)	64.2 (11.9)	
Range	1.0 - 94.0	8.0 - 91.0	

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

Table 12: Endovascular Repair for Aortoiliac Occlusive Disease

	2019 (N=297)	2020 (N=377)	p value
Segment			0.331
Thoracoabdominal Crawford 4	0 (0.0%)	3 (0.8%)	
Aorto-iliac including suprarenal segment	1 (0.3%)	1 (0.3%)	
Aorto-iliac including infrarenal segment	27 (9.1%)	43 (11.4%)	
Isolated iliac arteries	269 (90.6%)	330 (87.5%)	
Pathology			0.237
Dissection without aneurysm formation	9 (3.0%)	16 (4.2%)	
Obstruction intraluminally	22 (7.4%)	34 (9.0%)	
Obstruction wall pathology	260 (87.5%)	325 (86.2%)	
Obstruction by external compression	3 (1.0%)	2 (0.5%)	
Source of emboli w/o pathology of the vessel wall	3 (1.0%)	0 (0.0%)	
Clinical Problem			0.485
No problem	19 (6.4%)	25 (6.6%)	
Symptomatic	8 (2.7%)	14 (3.7%)	
Bleeding	4 (1.3%)	2 (0.5%)	
Local swelling, inflammation or displacement	0 (0.0%)	1 (0.3%)	
Acute Ischemia	17 (5.7%)	34 (9.0%)	
Distal embolisation	2 (0.7%)	3 (0.8%)	
Chronic relative ischemia	181 (60.9%)	206 (54.6%)	
Chronic critical ischemia	66 (22.2%)	92 (24.4%)	
Vascular Intervention			0.683
N-Miss	0	2	
Vascular graft	12 (4.0%)	17 (4.5%)	
Bifurcated graft	5 (1.7%)	12 (3.2%)	
Complex bifurcated graft (Y + branches)	1 (0.3%)	2 (0.5%)	
Isolated dilatation (PTA/Stent)	263 (88.6%)	329 (87.7%)	
Mural desobliteration w/wo patch	3 (1.0%)	2 (0.5%)	
Luminal desobliteration (e.g. embolectomy)	6 (2.0%)	3 (0.8%)	
Fenestration (only in dissections)	1 (0.3%)	2 (0.5%)	
Sealing	1 (0.3%)	0 (0.0%)	
Imaging	5 (1.7%)	8 (2.1%)	
Sterility			0.277
Infected or presumably infected	1 (0.3%)	4 (1.1%)	
Sterile operation	296 (99.7%)	373 (98.9%)	

	2019 (N=297)	2020 (N=377)	p value
Previous interventions			0.001
No previous intervention at the same location	205 (69.0%)	307 (81.4%)	
Planned consecutive intervention	20 (6.7%)	7 (1.9%)	
Revision within 30d - inhouse complications	11 (3.7%)	9 (2.4%)	
Revision within 30d - extern complications	1 (0.3%)	2 (0.5%)	
Redo	60 (20.2%)	52 (13.8%)	
Conversion			0.446
N-Miss	60	40	
No Conversion	228 (96.2%)	328 (97.3%)	
Conversion	9 (3.8%)	9 (2.7%)	
Sex			0.331
N-Miss	0	1	
Male	211 (71.0%)	254 (67.6%)	
Female	86 (29.0%)	122 (32.4%)	
Age (years)			0.481
N-Miss	0	1	
Mean (SD)	68.4 (9.8)	69.0 (10.2)	
Range	37.0 - 92.0	30.0 - 93.0	

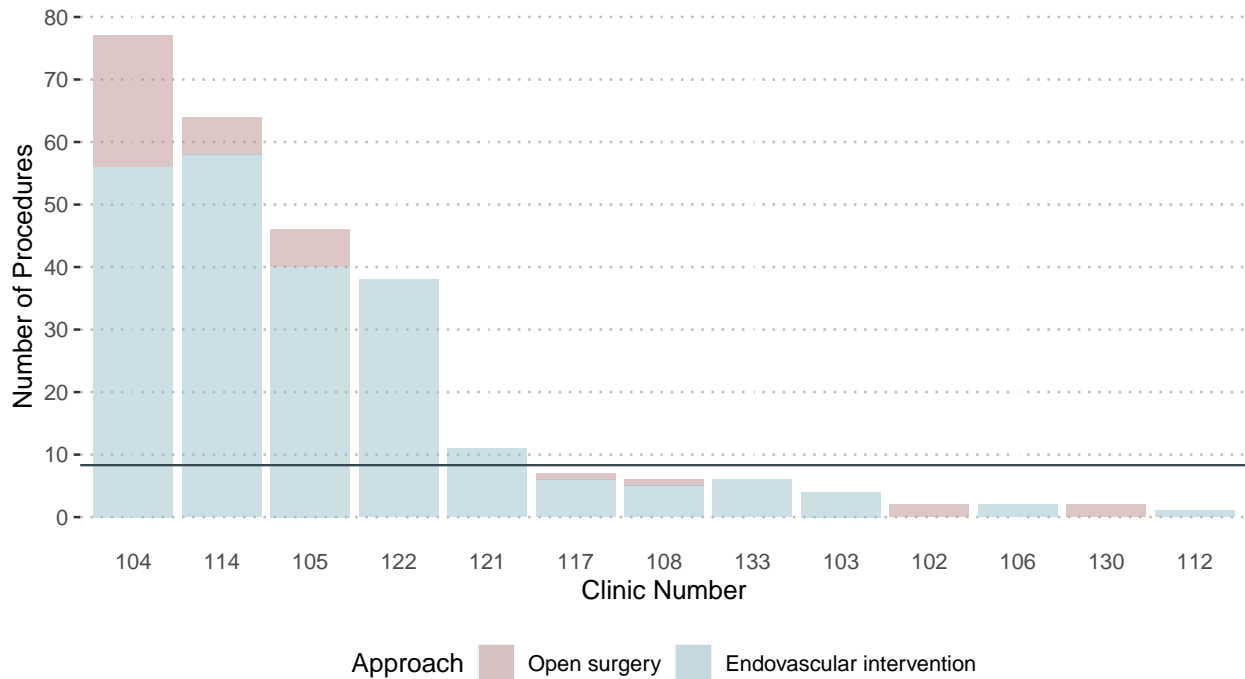
8 Surgery of the Thoracic Aorta

Table 13: Surgery of the Thoracic Aorta

	2019 (N=202)	2020 (N=266)	p value
Segment			0.124
Thoracoabdominal Crawford 1	26 (12.9%)	27 (10.2%)	
Thoracoabdominal Crawford 2	22 (10.9%)	17 (6.4%)	
Thoracoabdominal Crawford 3	35 (17.3%)	63 (23.7%)	
Ascending aorta including aortic arch	8 (4.0%)	6 (2.3%)	
Aortic arch and descendens	41 (20.3%)	45 (16.9%)	
Descending aorta	70 (34.7%)	108 (40.6%)	
Approach			0.182
Open surgery	39 (19.3%)	39 (14.7%)	
Endovascular intervention	163 (80.7%)	227 (85.3%)	
Pathology			0.425
No vascular pathology	3 (1.5%)	4 (1.5%)	
Vascular wall injury / pseudoaneurysm	23 (11.4%)	29 (10.9%)	
Aneurysm (true)	104 (51.5%)	123 (46.2%)	
Inflammatory aneurysm (sterile)	3 (1.5%)	0 (0.0%)	
Dissection without aneurysm formation	23 (11.4%)	40 (15.0%)	
Dissection with aneurysm formation	35 (17.3%)	52 (19.5%)	
Obstruction intraluminally	0 (0.0%)	2 (0.8%)	
Obstruction wall pathology	3 (1.5%)	3 (1.1%)	
Obstruction by external compression	1 (0.5%)	0 (0.0%)	
Tumor	1 (0.5%)	4 (1.5%)	
Endoleak	6 (3.0%)	9 (3.4%)	
Clinical Problem			0.217
No problem	111 (55.0%)	129 (48.5%)	
Symptomatic	59 (29.2%)	90 (33.8%)	
Bleeding	28 (13.9%)	32 (12.0%)	
Local swelling, inflammation or displacement	0 (0.0%)	6 (2.3%)	
Acute Ischemia	1 (0.5%)	2 (0.8%)	
Chronic relative ischemia	3 (1.5%)	5 (1.9%)	
Chronic critical ischemia	0 (0.0%)	2 (0.8%)	
Vascular Intervention			0.182
N-Miss	12	1	
Vascular graft	142 (74.7%)	201 (75.8%)	
Bifurcated graft	9 (4.7%)	4 (1.5%)	

	2019 (N=202)	2020 (N=266)	p value
Complex bifurcated graft (Y + branches)	25 (13.2%)	27 (10.2%)	
Repair of vessel wall	6 (3.2%)	7 (2.6%)	
Isolated dilatation (PTA/Stent)	3 (1.6%)	13 (4.9%)	
Mural desobliteration w/wo patch	2 (1.1%)	2 (0.8%)	
Sealing	2 (1.1%)	8 (3.0%)	
Resection of av-malform	0 (0.0%)	1 (0.4%)	
De-/rebranching	1 (0.5%)	2 (0.8%)	
Sterility			0.744
Infected or presumably infected	3 (1.5%)	5 (1.9%)	
Sterile operation	199 (98.5%)	261 (98.1%)	
Sex			0.410
Male	127 (62.9%)	177 (66.5%)	
Female	75 (37.1%)	89 (33.5%)	
Age (years)			0.935
Mean (SD)	69.2 (13.4)	69.3 (11.7)	
Range	10.0 - 92.0	20.0 - 90.0	

8.1 Treatment of the Thoracic Aorta in 2020 - National Overview



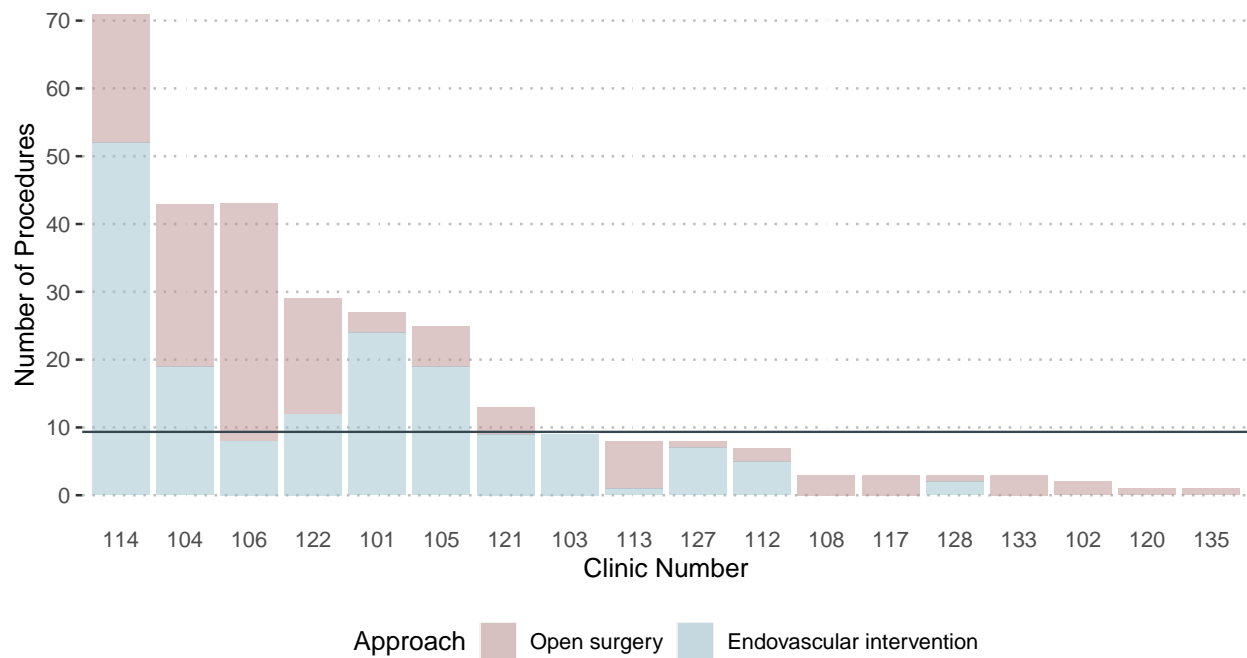
9 Surgery of the Renovisceral Arteries

Table 14: Surgery of the Renovisceral Arteries

	2019 (N=258)	2020 (N=299)	p value
Segment			0.210
Renal arteries	118 (45.7%)	121 (40.5%)	
Visceral arteries	140 (54.3%)	178 (59.5%)	
Approach			0.515
Open surgery	121 (46.9%)	132 (44.1%)	
Endovascular intervention	137 (53.1%)	167 (55.9%)	
Pathology			< 0.001
N-Miss	0	1	
No vascular pathology	97 (37.6%)	94 (31.5%)	
Vascular wall injury / pseudoaneurysm	10 (3.9%)	14 (4.7%)	
Aneurysm (true)	59 (22.9%)	36 (12.1%)	
Inflammatory aneurysm (sterile)	1 (0.4%)	0 (0.0%)	
Dissection without aneurysm formation	8 (3.1%)	14 (4.7%)	
Dissection with aneurysm formation	2 (0.8%)	4 (1.3%)	
Obstruction intraluminally	25 (9.7%)	14 (4.7%)	
Obstruction wall pathology	44 (17.1%)	101 (33.9%)	
Obstruction by external compression	3 (1.2%)	2 (0.7%)	
Tumor	1 (0.4%)	5 (1.7%)	
Endoleak	8 (3.1%)	14 (4.7%)	
Clinical Problem			0.113
N-Miss	0	1	
No problem	173 (67.1%)	186 (62.4%)	
Symptomatic	30 (11.6%)	41 (13.8%)	
Bleeding	14 (5.4%)	29 (9.7%)	
Local swelling, inflammation or displacement	6 (2.3%)	3 (1.0%)	
Acute Ischemia	21 (8.1%)	21 (7.0%)	
Chronic relative ischemia	9 (3.5%)	5 (1.7%)	
Chronic critical ischemia	5 (1.9%)	13 (4.4%)	
Type of Intervention			0.340
Isolated main Procedure	107 (41.5%)	147 (49.2%)	
Main Procedure with additional Procedure	46 (17.8%)	43 (14.4%)	
Additional Procedure for Outflow Optimization	17 (6.6%)	18 (6.0%)	
Additional Procedure: De-/rebranching	87 (33.7%)	91 (30.4%)	
Additional Procedure: Diagnostic	1 (0.4%)	0 (0.0%)	

	2019 (N=258)	2020 (N=299)	p value
Sex			0.536
Male	182 (70.5%)	218 (72.9%)	
Female	76 (29.5%)	81 (27.1%)	
Age (years)			0.447
Mean (SD)	70.8 (12.0)	70.1 (10.7)	
Range	12.0 - 91.0	20.0 - 95.0	

9.1 Treatment of the Renovisceral Arteries in 2020 - National Overview



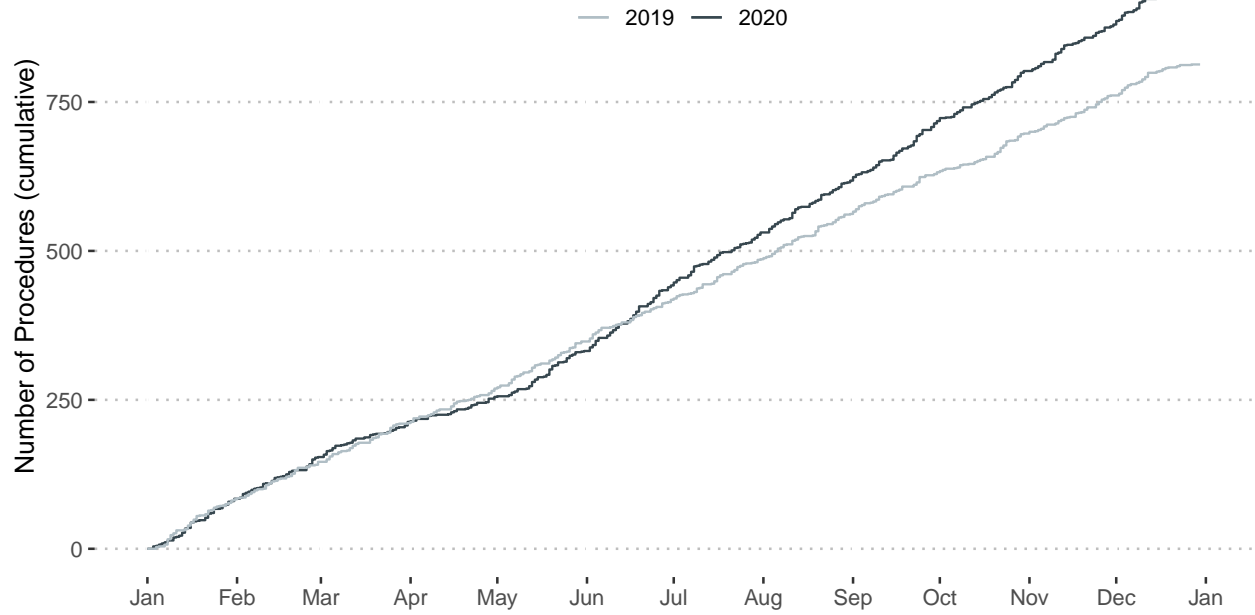
10 Treatment of the Femoral Bifurcation

Table 15: Surgery on femoral bifurcation

	2019 (N=1049)	2020 (N=1208)	p value
Pathology			0.007
No vascular pathology	30 (2.9%)	32 (2.6%)	
Vascular wall injury / pseudoaneurysm	111 (10.6%)	107 (8.9%)	
Aneurysm (true)	56 (5.3%)	45 (3.7%)	
Inflammatory aneurysm (sterile)	0 (0.0%)	2 (0.2%)	
Dissection without aneurysm formation	22 (2.1%)	12 (1.0%)	
Dissection with aneurysm formation	0 (0.0%)	3 (0.2%)	
Obstruction intraluminally	174 (16.6%)	173 (14.3%)	
Obstruction wall pathology	653 (62.2%)	818 (67.7%)	
Obstruction by external compression	0 (0.0%)	3 (0.2%)	
AV-malformation	1 (0.1%)	4 (0.3%)	
Source of emboli w/o pathology of the vessel wall	0 (0.0%)	2 (0.2%)	
Tumor	2 (0.2%)	4 (0.3%)	
Endoleak	0 (0.0%)	3 (0.2%)	
Vascular Intervention			< 0.001
N-Miss	11	0	
Vascular graft	121 (11.7%)	113 (9.4%)	
Bifurcated graft	40 (3.9%)	32 (2.6%)	
Complex bifurcated graft (Y + branches)	8 (0.8%)	6 (0.5%)	
Repair of vessel wall	58 (5.6%)	65 (5.4%)	
Isolated dilatation (PTA/Stent)	5 (0.5%)	65 (5.4%)	
Mural desobliteration w/wo patch	715 (68.9%)	809 (67.0%)	
Luminal desobliteration (e.g. embolectomy)	75 (7.2%)	97 (8.0%)	
Fenestration (only in dissections)	1 (0.1%)	2 (0.2%)	
Sealing	4 (0.4%)	7 (0.6%)	
Therapeutic occlusion of vessels	1 (0.1%)	2 (0.2%)	
Resection of av-malform	2 (0.2%)	3 (0.2%)	
De-/rebranching	4 (0.4%)	6 (0.5%)	
Imaging	4 (0.4%)	1 (0.1%)	
Material			0.025
N-Miss	0	3	
Autologous Material Only	44 (4.2%)	48 (4.0%)	
Biological Material	656 (62.5%)	778 (64.6%)	
Synthetic Material for Vessel wall	153 (14.6%)	126 (10.5%)	

	2019 (N=1049)	2020 (N=1208)	p value
Coils, Plugs, etc	0 (0.0%)	2 (0.2%)	
No material	196 (18.7%)	251 (20.8%)	
Inflow			0.016
N-Miss	26	323	
Same Approach	35 (3.4%)	31 (3.5%)	
Hybrid Approach	98 (9.6%)	122 (13.8%)	
No Inflow Optimization	890 (87.0%)	732 (82.7%)	
Outflow			0.017
N-Miss	26	322	
Same Approach	55 (5.4%)	48 (5.4%)	
Hybrid Approach	45 (4.4%)	66 (7.4%)	
No Outflow Optimization	923 (90.2%)	772 (87.1%)	
Sterility			0.918
N-Miss	1	2	
Infected or presumably infected	47 (4.5%)	53 (4.4%)	
Sterile operation	1001 (95.5%)	1153 (95.6%)	
Gender			0.145
N-Miss	1	1	
Male	735 (70.1%)	812 (67.3%)	
Female	313 (29.9%)	395 (32.7%)	
Age (years)			0.508
Mean (SD)	71.2 (11.4)	71.6 (11.1)	
Range	0.0 - 97.0	14.0 - 104.0	

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

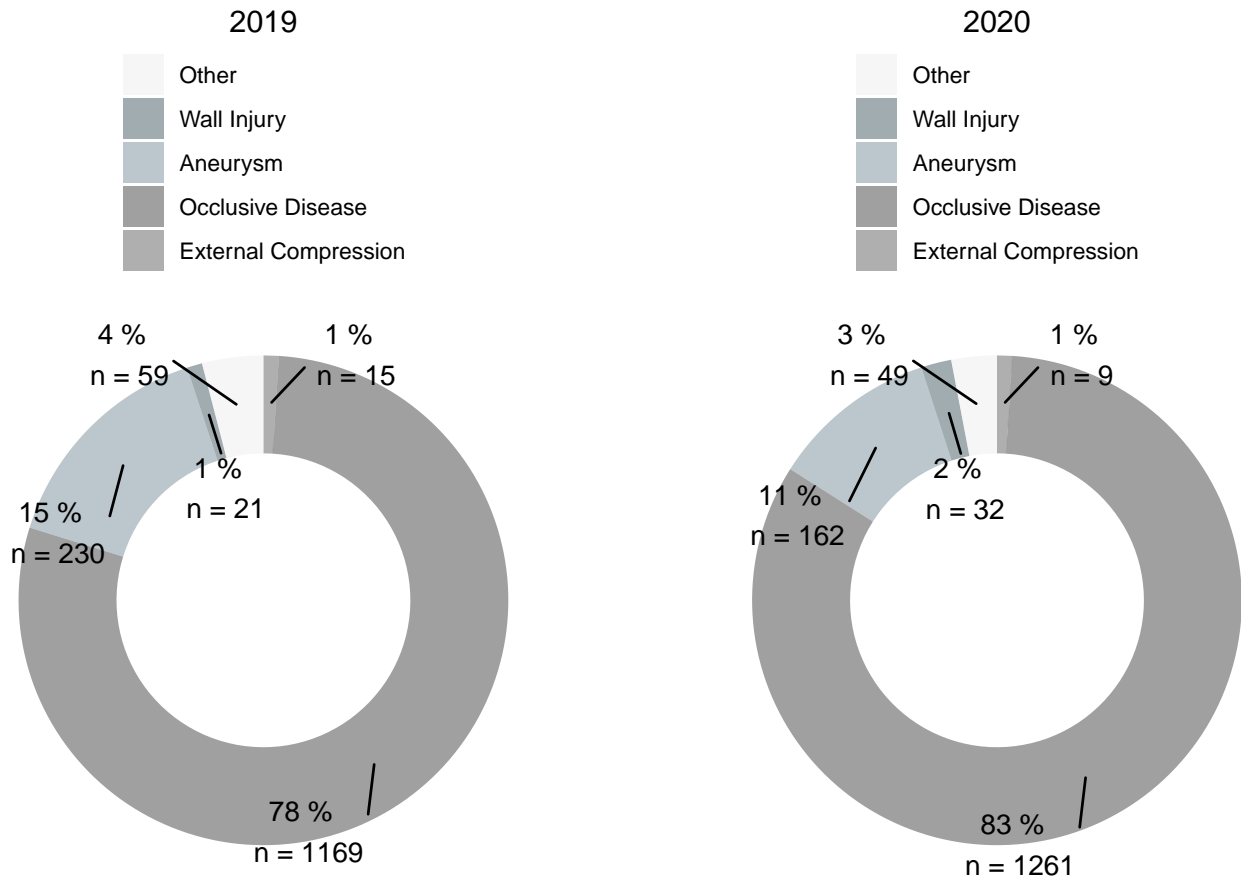


11 Treatment of Arteries of the Lower Extremity

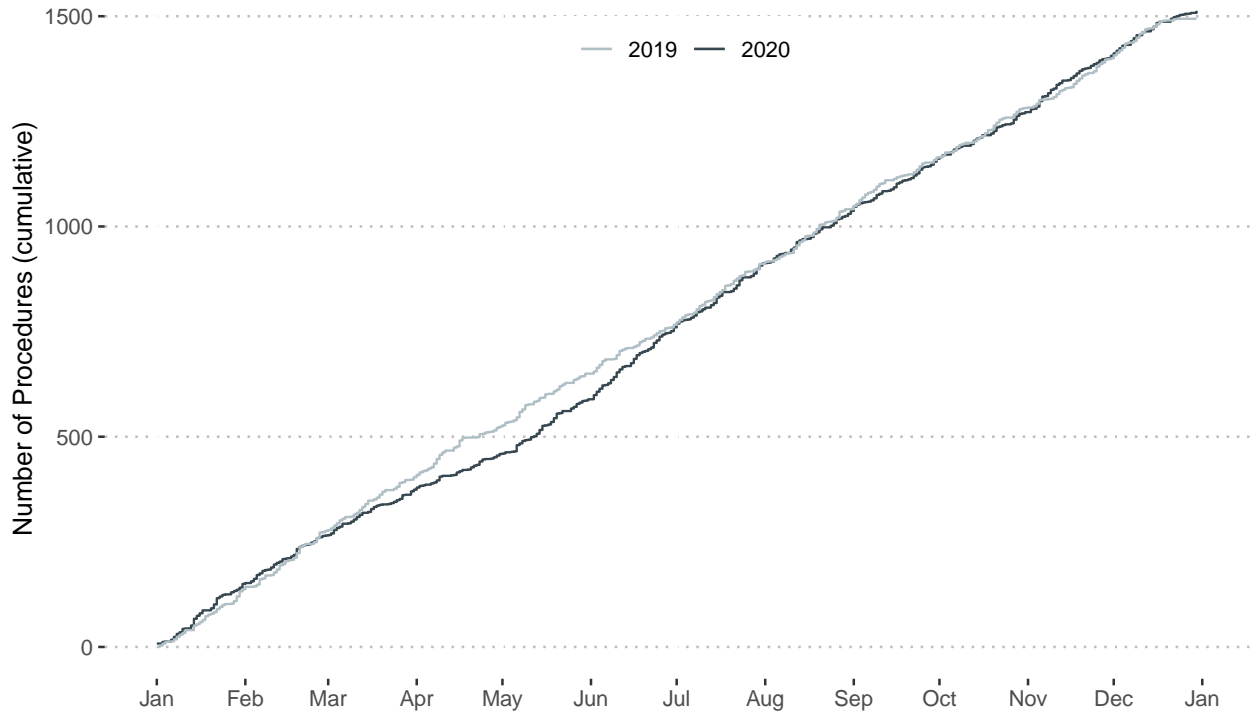
Table 16: Overview - Bypass Surgery of the Lower Extremity

	2019 (N=1494)	2020 (N=1513)	p value
Segment			< 0.001
Femoro-popliteal, supragenicular	543 (36.3%)	417 (27.6%)	
Isolated popliteal	140 (9.4%)	129 (8.5%)	
Femoro-popliteal, infragenicular	315 (21.1%)	347 (22.9%)	
Femoro-cural, infrapopliteal	248 (16.6%)	293 (19.4%)	
Popliteal trifurcation and crural-pedal	248 (16.6%)	327 (21.6%)	
Type of Intervention			0.026
Isolated main Procedure	698 (46.7%)	729 (48.2%)	
Main Procedure with additional Procedure	621 (41.6%)	563 (37.2%)	
Additional Procedure for Inflow Optimization	22 (1.5%)	22 (1.5%)	
Additional Procedure for Outflow Optimization	151 (10.1%)	198 (13.1%)	
Additional Procedure: De-/rebranching	0 (0.0%)	1 (0.1%)	
Additional Procedure: Diagnostic	2 (0.1%)	0 (0.0%)	
Material			< 0.001
N-Miss	0	9	
Autologous Material Only	564 (37.8%)	560 (37.2%)	
Biological Material	46 (3.1%)	72 (4.8%)	
Synthetic Material for Vessel wall	233 (15.6%)	213 (14.2%)	
Coils, Plugs, etc	67 (4.5%)	156 (10.4%)	
No material	584 (39.1%)	503 (33.4%)	
Sterility			0.766
N-Miss	4	1	
Infected or presumably infected	34 (2.3%)	37 (2.4%)	
Sterile operation	1456 (97.7%)	1475 (97.6%)	
Sex			0.713
N-Miss	0	2	
Male	1070 (71.6%)	1073 (71.0%)	
Female	424 (28.4%)	438 (29.0%)	
Age (years)			0.003
Mean (SD)	71.0 (12.4)	72.3 (12.2)	
Range	11.0 - 100.0	0.0 - 99.0	

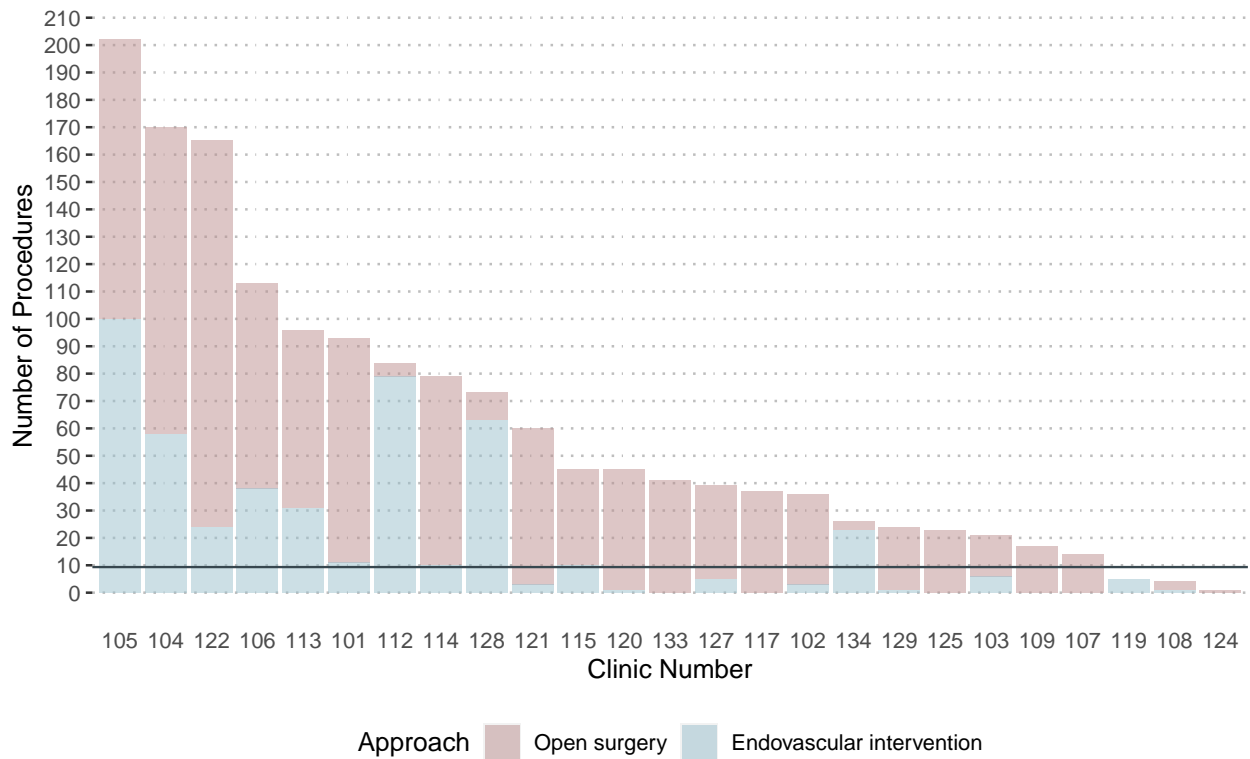
11.0.1 Treated Pathologies at the Lower Extremities (excluding Femoral Bifurcation)



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



11.0.3 Surgery Arteries of the Lower Extremity in 2020 - National Overview



11.1 Surgery on the supragenicular femoro-popliteal Arteries

Table 17: Surgery on the supragenicular femoro-popliteal Arteries

	2019 (N=543)	2020 (N=417)	p value
Pathology			0.022
No vascular pathology	8 (1.5%)	9 (2.2%)	
Vascular wall injury / pseudoaneurysm	9 (1.7%)	11 (2.6%)	
Aneurysm (true)	32 (5.9%)	15 (3.6%)	
Dissection without aneurysm formation	2 (0.4%)	4 (1.0%)	
Dissection with aneurysm formation	1 (0.2%)	0 (0.0%)	
Obstruction intraluminally	81 (14.9%)	92 (22.1%)	
Obstruction wall pathology	401 (73.8%)	284 (68.1%)	
Obstruction by external compression	2 (0.4%)	1 (0.2%)	
AV-malformation	0 (0.0%)	1 (0.2%)	
Deep venous insufficiency	1 (0.2%)	0 (0.0%)	
No vascular pathology / vascular access or diagnostic procedures)	6 (1.1%)	0 (0.0%)	
Vascular Intervention			< 0.001
N-Miss	3	0	
Vascular graft	147 (27.2%)	140 (33.6%)	
Bifurcated graft	0 (0.0%)	1 (0.2%)	
Repair of vessel wall	3 (0.6%)	1 (0.2%)	
Isolated dilatation (PTA/Stent)	306 (56.7%)	182 (43.6%)	
Mural desobliteration w/wo patch	6 (1.1%)	14 (3.4%)	
Luminal desobliteration (e.g. embolectomy)	43 (8.0%)	64 (15.3%)	
Extramural deblockage	5 (0.9%)	3 (0.7%)	
Sealing	3 (0.6%)	0 (0.0%)	
Therapeutic occlusion of vessels	1 (0.2%)	0 (0.0%)	
De-/rebranching	5 (0.9%)	2 (0.5%)	
Imaging	21 (3.9%)	10 (2.4%)	
Material			< 0.001
N-Miss	0	1	
Autologous Material Only	92 (16.9%)	80 (19.2%)	
Biological Material	12 (2.2%)	19 (4.6%)	
Synthetic Material for Vessel wall	131 (24.1%)	94 (22.6%)	
Coils, Plugs, etc	54 (9.9%)	93 (22.4%)	
No material	254 (46.8%)	130 (31.2%)	

	2019 (N=543)	2020 (N=417)	p value
Inflow			0.021
N-Miss	94	73	
Same Approach	29 (6.5%)	29 (8.4%)	
Hybrid Approach	1 (0.2%)	7 (2.0%)	
No Inflow Optimization	419 (93.3%)	308 (89.5%)	
Outflow			0.863
N-Miss	94	73	
Same Approach	15 (3.3%)	14 (4.1%)	
Hybrid Approach	8 (1.8%)	6 (1.7%)	
No Outflow Optimization	426 (94.9%)	324 (94.2%)	
Sterility			0.139
N-Miss	1	0	
Infected or presumably infected	12 (2.2%)	16 (3.8%)	
Sterile operation	530 (97.8%)	401 (96.2%)	
Sex			0.820
N-Miss	0	1	
Male	363 (66.9%)	281 (67.5%)	
Female	180 (33.1%)	135 (32.5%)	
Age (years)			0.549
Mean (SD)	72.5 (10.6)	73.0 (11.0)	
Range	35.0 - 100.0	0.0 - 97.0	

11.2 Surgery on the popliteal Artery

Table 18: Surgery on the popliteal Artery

	2019 (N=140)	2020 (N=129)	p value
Pathology			0.095
No vascular pathology	6 (4.3%)	3 (2.3%)	
Vascular wall injury / pseudoaneurysm	0 (0.0%)	7 (5.4%)	
Aneurysm (true)	86 (61.4%)	73 (56.6%)	
Inflammatory aneurysm (sterile)	1 (0.7%)	0 (0.0%)	
Obstruction intraluminally	9 (6.4%)	9 (7.0%)	
Obstruction wall pathology	28 (20.0%)	31 (24.0%)	
Obstruction by external compression	10 (7.1%)	6 (4.7%)	
Vascular Intervention			0.394
N-Miss	7	0	
Vascular graft	87 (65.4%)	86 (66.7%)	
Bifurcated graft	2 (1.5%)	0 (0.0%)	
Repair of vessel wall	2 (1.5%)	0 (0.0%)	
Isolated dilatation (PTA/Stent)	23 (17.3%)	27 (20.9%)	
Mural desobliteration w/wo patch	4 (3.0%)	2 (1.6%)	
Luminal desobliteration (e.g. embolectomy)	4 (3.0%)	7 (5.4%)	
Extramural deblockage	10 (7.5%)	5 (3.9%)	
Therapeutic occlusion of vessels	0 (0.0%)	1 (0.8%)	
Resection of av-malform	1 (0.8%)	1 (0.8%)	
Material			0.979
N-Miss	0	2	
Autologous Material Only	81 (57.9%)	78 (61.4%)	
Biological Material	2 (1.4%)	2 (1.6%)	
Synthetic Material for Vessel wall	13 (9.3%)	10 (7.9%)	
Coils, Plugs, etc	1 (0.7%)	1 (0.8%)	
No material	43 (30.7%)	36 (28.3%)	
Inflow			0.625
N-Miss	31	66	
Same Approach	3 (2.8%)	1 (1.6%)	
No Inflow Optimization	106 (97.2%)	62 (98.4%)	
Outflow			0.899
N-Miss	31	66	
Same Approach	6 (5.5%)	4 (6.3%)	
Hybrid Approach	1 (0.9%)	1 (1.6%)	

	2019 (N=140)	2020 (N=129)	p value
No Outflow Optimization	102 (93.6%)	58 (92.1%)	
Sterility			0.139
Infected or presumably infected	0 (0.0%)	2 (1.6%)	
Sterile operation	140 (100.0%)	127 (98.4%)	
Sex			0.228
Male	114 (81.4%)	112 (86.8%)	
Female	26 (18.6%)	17 (13.2%)	
Age (years)			0.291
Mean (SD)	67.0 (16.2)	69.0 (14.6)	
Range	19.0 - 94.0	2.0 - 93.0	

11.3 Surgery on the infragenicular and crural Arteries

Table 19: Surgery on the infragenicular and crural Arteries

	2019 (N=811)	2020 (N=967)	p value
Segment			0.290
Femoro-popliteal, infragenicular	315 (38.8%)	347 (35.9%)	
Femoro-crural, infrapopliteal	248 (30.6%)	293 (30.3%)	
Popliteal trifurcation and crural-pedal	248 (30.6%)	327 (33.8%)	
Pathology			< 0.001
No vascular pathology	31 (3.8%)	17 (1.8%)	
Vascular wall injury / pseudoaneurysm	12 (1.5%)	14 (1.4%)	
Aneurysm (true)	110 (13.6%)	72 (7.4%)	
Inflammatory aneurysm (sterile)	0 (0.0%)	1 (0.1%)	
Dissection without aneurysm formation	3 (0.4%)	3 (0.3%)	
Dissection with aneurysm formation	0 (0.0%)	1 (0.1%)	
Obstruction intraluminally	253 (31.2%)	271 (28.0%)	
Obstruction wall pathology	397 (49.0%)	574 (59.4%)	
Obstruction by external compression	3 (0.4%)	2 (0.2%)	
AV-malformation	2 (0.2%)	10 (1.0%)	
Source of emboli w/o pathology of the vessel wall	0 (0.0%)	1 (0.1%)	
Tumor	0 (0.0%)	1 (0.1%)	
Vascular Intervention			0.232
N-Miss	17	0	
Vascular graft	448 (56.4%)	488 (50.5%)	
Bifurcated graft	3 (0.4%)	8 (0.8%)	
Complex bifurcated graft (Y + branches)	1 (0.1%)	3 (0.3%)	
Repair of vessel wall	7 (0.9%)	5 (0.5%)	
Isolated dilatation (PTA/Stent)	160 (20.2%)	245 (25.3%)	
Mural desobliteration w/wo patch	23 (2.9%)	33 (3.4%)	
Luminal desobliteration (e.g. embolectomy)	138 (17.4%)	168 (17.4%)	
Extramural deblockage	5 (0.6%)	10 (1.0%)	
Therapeutic occlusion of vessels	2 (0.3%)	2 (0.2%)	
Resection of av-malform	1 (0.1%)	2 (0.2%)	
De-/rebranching	2 (0.3%)	1 (0.1%)	
Imaging	4 (0.5%)	2 (0.2%)	
Material			< 0.001
N-Miss	0	6	
Autologous Material Only	391 (48.2%)	402 (41.8%)	

	2019 (N=811)	2020 (N=967)	p value
Biological Material	32 (3.9%)	51 (5.3%)	
Synthetic Material for Vessel wall	89 (11.0%)	109 (11.3%)	
Coils, Plugs, etc	12 (1.5%)	62 (6.5%)	
No material	287 (35.4%)	337 (35.1%)	
Inflow			0.315
N-Miss	101	298	
Same Approach	66 (9.3%)	59 (8.8%)	
Hybrid Approach	15 (2.1%)	23 (3.4%)	
No Inflow Optimization	629 (88.6%)	587 (87.7%)	
Outflow			0.155
N-Miss	101	297	
Same Approach	58 (8.2%)	48 (7.2%)	
Hybrid Approach	18 (2.5%)	29 (4.3%)	
No Outflow Optimization	634 (89.3%)	593 (88.5%)	
Sterility			0.291
N-Miss	3	1	
Infected or presumably infected	22 (2.7%)	19 (2.0%)	
Sterile operation	786 (97.3%)	947 (98.0%)	
Sex			0.204
N-Miss	0	1	
Male	593 (73.1%)	680 (70.4%)	
Female	218 (26.9%)	286 (29.6%)	
Age (years)			0.001
Mean (SD)	70.6 (12.6)	72.5 (12.3)	
Range	11.0 - 98.0	0.0 - 99.0	

12 Access Surgery

Table 20: Dialysis Access Surgery

	2019 (N=889)	2020 (N=1205)	p value
SGG OP Code			< 0.001
N-Miss	0	1	
Surgery on occlusion of upper extremity	0 (0.0%)	3 (0.2%)	
Cimino-Brescia fistula	130 (14.6%)	149 (12.4%)	
Tabatiere fistula	25 (2.8%)	42 (3.5%)	
Brachio-cephalic fistula	111 (12.5%)	206 (17.1%)	
Other vascular access (incl. Catheter)	6 (0.7%)	3 (0.2%)	
Dialysis fistula other location	31 (3.5%)	48 (4.0%)	
Thrombectomy AV-Shunt	60 (6.7%)	94 (7.8%)	
Other AV-Shunt (others)	99 (11.1%)	202 (16.8%)	
Abolition of AV-Shunt	51 (5.7%)	46 (3.8%)	
Venous dialysis catheter	366 (41.2%)	392 (32.6%)	
Revasc for acute arterial occlusion	2 (0.2%)	0 (0.0%)	
Septic vascular surgery	1 (0.1%)	2 (0.2%)	
Temporary av-fistula (venous thrombectomy)	0 (0.0%)	1 (0.1%)	
Angiography	1 (0.1%)	0 (0.0%)	
Intervention in A. subclavia, brachiocephalic trunk, A axillaris	1 (0.1%)	1 (0.1%)	
Intervention in brachial arteries	5 (0.6%)	15 (1.2%)	

12.1 Catheters versus AV-Fistula/Shunts

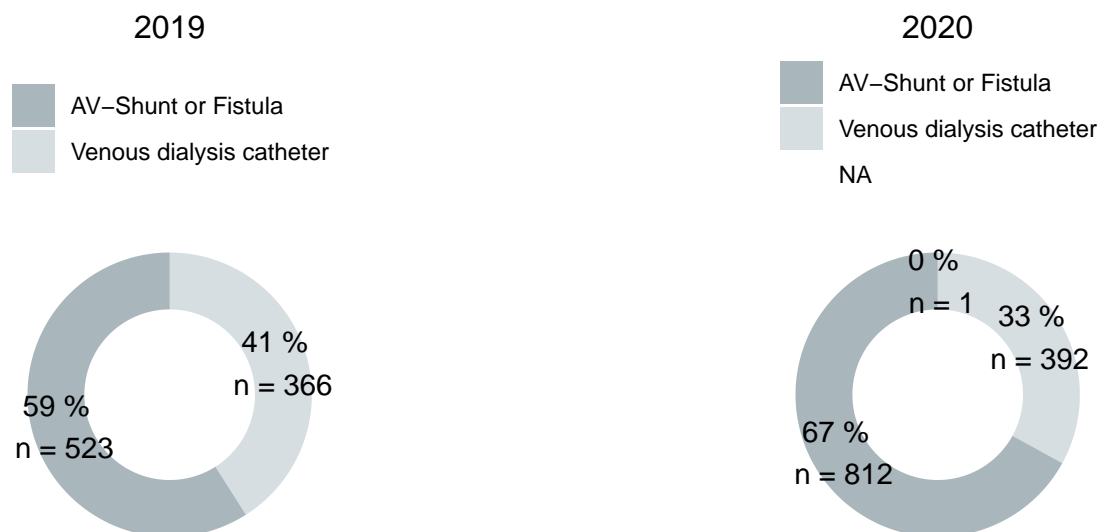


Table 21: AV-Fistula or AV-Shunt

	2019 (N=523)	2020 (N=812)	p value
Vascular Intervention			< 0.001
N-Miss	0	6	
Vascular graft	80 (15.3%)	142 (17.6%)	
Repair of vessel wall	27 (5.2%)	30 (3.7%)	
Isolated dilatation (PTA/Stent)	8 (1.5%)	72 (8.9%)	
Mural desobliteration w/wo patch	13 (2.5%)	21 (2.6%)	
Luminal desobliteration (e.g. embolectomy)	60 (11.5%)	81 (10.0%)	
Extramural deblockage	1 (0.2%)	2 (0.2%)	
Sealing	0 (0.0%)	1 (0.1%)	
Therapeutic occlusion of vessels	51 (9.8%)	41 (5.1%)	
Resection of av-malform	3 (0.6%)	4 (0.5%)	
Isolated phlebectomy	1 (0.2%)	0 (0.0%)	
Creation of a therapeutic AV-fistula	275 (52.6%)	400 (49.6%)	
De-/rebranching	1 (0.2%)	2 (0.2%)	
Imaging	3 (0.6%)	10 (1.2%)	
Segment			< 0.001
N-Miss	3	0	
Brachial artery	19 (3.7%)	9 (1.1%)	
Cubita and forearm	18 (3.5%)	12 (1.5%)	
Arteries of wrist	9 (1.7%)	6 (0.7%)	
Vena cava superior	1 (0.2%)	0 (0.0%)	
Subclavian vein axillary vein	1 (0.2%)	0 (0.0%)	
Arm veins	1 (0.2%)	3 (0.4%)	
Forearm	198 (38.1%)	353 (43.5%)	
Wrist	38 (7.3%)	50 (6.2%)	
Cubital forearm	133 (25.6%)	180 (22.2%)	
Upper arm	100 (19.2%)	189 (23.3%)	
Leg	2 (0.4%)	10 (1.2%)	
Material			< 0.001
N-Miss	0	10	
Autologous Material Only	54 (10.3%)	147 (18.3%)	
Biological Material	21 (4.0%)	25 (3.1%)	
Synthetic Material for Vessel wall	81 (15.5%)	94 (11.7%)	
Coils, Plugs, etc	3 (0.6%)	8 (1.0%)	
No material	364 (69.6%)	528 (65.8%)	
Pathology			0.491

	2019 (N=523)	2020 (N=812)	p value
N-Miss	0	6	
No vascular pathology	382 (73.0%)	609 (75.6%)	
Vascular wall injury / pseudoaneurysm	11 (2.1%)	22 (2.7%)	
Aneurysm (true)	5 (1.0%)	14 (1.7%)	
Dissection with aneurysm formation	0 (0.0%)	1 (0.1%)	
Obstruction intraluminally	85 (16.3%)	111 (13.8%)	
Obstruction wall pathology	37 (7.1%)	46 (5.7%)	
Obstruction by external compression	1 (0.2%)	0 (0.0%)	
Deep venous insufficiency	0 (0.0%)	1 (0.1%)	
Source of emboli w/o pathology of the vessel wall	2 (0.4%)	2 (0.2%)	
Sterility			0.925
N-Miss	2	0	
Infected or presumably infected	8 (1.5%)	13 (1.6%)	
Sterile operation	513 (98.5%)	799 (98.4%)	
Age (years)			0.372
Mean (SD)	65.0 (14.0)	65.8 (14.9)	
Range	19.0 - 91.0	10.0 - 95.0	
Sex			0.238
N-Miss	1	1	
Male	341 (65.3%)	555 (68.4%)	
Female	181 (34.7%)	256 (31.6%)	

13 Treatment of Deep Veins

Table 22: Treatment of Deep Veins

	2019 (N=67)	2020 (N=73)	p value
Segment			0.250
Deep pelvic veins	23 (34.3%)	17 (23.3%)	
Vena cava inferior	5 (7.5%)	8 (11.0%)	
Vena cava superior	1 (1.5%)	1 (1.4%)	
Subclavian vein axillary vein	5 (7.5%)	4 (5.5%)	
Arm veins	4 (6.0%)	3 (4.1%)	
Deep leg veins including femoral bifurcation	24 (35.8%)	39 (53.4%)	
Portal vein	5 (7.5%)	1 (1.4%)	
Pathology			0.023
No vascular pathology	9 (13.4%)	2 (2.7%)	
Vascular wall injury / pseudoaneurysm	28 (41.8%)	23 (31.5%)	
Aneurysm (true)	3 (4.5%)	1 (1.4%)	
Obstruction intraluminally	17 (25.4%)	33 (45.2%)	
Obstruction wall pathology	1 (1.5%)	2 (2.7%)	
Obstruction by external compression	0 (0.0%)	4 (5.5%)	
AV-malformation	0 (0.0%)	1 (1.4%)	
No vascular pathology / vascular access or diagnostic procedures)	2 (3.0%)	0 (0.0%)	
Source of emboli w/o pathology of the vessel wall	0 (0.0%)	1 (1.4%)	
Tumor	7 (10.4%)	6 (8.2%)	
Vascular Intervention			0.223
Vascular graft	19 (28.4%)	20 (27.4%)	
Bifurcated graft	0 (0.0%)	1 (1.4%)	
Complex bifurcated graft (Y + branches)	1 (1.5%)	0 (0.0%)	
Repair of vessel wall	22 (32.8%)	19 (26.0%)	
Isolated dilatation (PTA/Stent)	5 (7.5%)	5 (6.8%)	
Mural desobliteration w/wo patch	3 (4.5%)	4 (5.5%)	
Luminal desobliteration (e.g. embolectomy)	8 (11.9%)	16 (21.9%)	
Extramural deblockage	0 (0.0%)	2 (2.7%)	
Sealing	0 (0.0%)	1 (1.4%)	
Therapeutic occlusion of vessels	2 (3.0%)	0 (0.0%)	
Resection of av-malform	1 (1.5%)	0 (0.0%)	
Creation of a therapeutic AV-fistula	0 (0.0%)	3 (4.1%)	
De-/rebranching	5 (7.5%)	1 (1.4%)	

	2019 (N=67)	2020 (N=73)	p value
Imaging	1 (1.5%)	1 (1.4%)	
Sterility			0.275
Infected or presumably infected	7 (10.4%)	4 (5.5%)	
Sterile operation	60 (89.6%)	69 (94.5%)	
Sex			0.660
Male	41 (61.2%)	42 (57.5%)	
Female	26 (38.8%)	31 (42.5%)	
Age (years)			0.198
Mean (SD)	59.5 (17.5)	55.6 (17.8)	
Range	15.0 - 87.0	18.0 - 80.0	

14 Treatment of Varicosis

Table 23: Surgery on Superficial Veins

	2019 (N=2181)	2020 (N=1989)	p value
SGG OP Code			< 0.001
Isolated native crossectomy or revision	123 (5.6%)	87 (4.4%)	
Crossectomy with stripping (VSM or VSP or VSAA)	653 (29.9%)	386 (19.4%)	
Varicosis vein dissection	524 (24.0%)	525 (26.4%)	
Isolated stripping of VSM or VSP	61 (2.8%)	49 (2.5%)	
Perforator ligation	162 (7.4%)	167 (8.4%)	
Combination of 11A to 11D	128 (5.9%)	148 (7.4%)	
Endovenous varicosis treatment	521 (23.9%)	612 (30.8%)	
Ulcer treatment with plastic reconstruction	9 (0.4%)	15 (0.8%)	
Sex			0.960
N-Miss	5	1	
Male	839 (38.6%)	768 (38.6%)	
Female	1337 (61.4%)	1220 (61.4%)	
Age (years)			0.540
N-Miss	1	5	
Mean (SD)	53.7 (14.3)	53.4 (15.3)	
Range	0.0 - 94.0	0.0 - 98.0	
Setting			< 0.001
N-Miss	3	3	
Outpatient	1454 (66.8%)	1512 (76.1%)	
Inpatient	724 (33.2%)	474 (23.9%)	

15 Amputations and other Soft Tissue Procedures

Table 24: Amputations and other non-vascular procedures

	2019 (N=2675)	2020 (N=3197)	p value
Procedure			< 0.001
Amputation of finger of hand	4 (0.1%)	0 (0.0%)	
Amputation of hindfoot	13 (0.5%)	11 (0.3%)	
Amputation of lower leg	104 (3.9%)	96 (3.0%)	
Amputation of metatarsus	170 (6.4%)	153 (4.8%)	
Amputation of thigh	41 (1.5%)	32 (1.0%)	
Amputation of toe	330 (12.3%)	376 (11.8%)	
Amputation of upper extremity	0 (0.0%)	1 (0.0%)	
Compartment Decompression abdominal	17 (0.6%)	14 (0.4%)	
Compartment Decompression thoracic	1 (0.0%)	1 (0.0%)	
Fasciotomy	122 (4.6%)	116 (3.6%)	
Lumbar sympathectomy	1 (0.0%)	0 (0.0%)	
Pacemaker Explantation	32 (1.2%)	4 (0.1%)	
Pacemaker Implantation	37 (1.4%)	7 (0.2%)	
Port Explantation	128 (4.8%)	136 (4.3%)	
Port Implantation	397 (14.8%)	534 (16.7%)	
Surgery on lymphatic drain disorder	4 (0.1%)	9 (0.3%)	
Through-knee amputation	6 (0.2%)	6 (0.2%)	
Ulcer treatment with plastic reconstruction	9 (0.3%)	15 (0.5%)	
Wound closure (2° or Thiersch)	234 (8.7%)	331 (10.4%)	
Wound Debridement w/o NPWT	350 (13.1%)	419 (13.1%)	
Wound Debridement with NWPT	675 (25.2%)	936 (29.3%)	
Sex			0.444
N-Miss	0	1	
Male	1674 (62.6%)	2031 (63.5%)	
Female	1001 (37.4%)	1165 (36.5%)	
Age (years)			0.048
N-Miss	0	2	
Mean (SD)	68.4 (14.5)	69.1 (14.1)	
Range	7.0 - 97.0	0.0 - 98.0	