Descriptive Statistics based on the VQI TEVAR Dataset

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population of interest: the asymptomatic and symptomatics groups.

	Overall
	(N=5772)
PRESENTATION	
Yes	0 (0%)
No	0 (0%)
Missing	5772 (100%)

Patient demographic and co-morbidities

Table: A comparison of the baseline demographic and co-morbidities characteristics for symptomatic versus asymptomatic patients who undergo the F-BEVAR procedure

	Total
	(N=5772)
R_PREOP_AMBUL	
Amb	117 (2.0%)
Amb w/ Assistance	6 (0.1%)
Missing	5649 (97.9%)
AGE	
Mean (SD)	69.4 (11.7)
Median [Min, Max]	71.0 [0, 90.0]
AGECAT	
Yes	0 (0%)
No	0 (0%)
Missing	5772 (100%)
GENDER	
Yes	0 (0%)
No	0 (0%)
Missing	5772 (100%)
ETHNICITY	
Hispanic or Latino	309 (5.4%)
None Hispanic or Latino	5458 (94.6%)
Missing	5 (0.1%)
RACE	
American Indian or Alaskan Native	11 (0.2%)
Asian	138 (2.4%)
Black or African American	832 (14.4%)
More than 1 race	13 (0.2%)
Native Hawaiian or other Pacific Islander	20 (0.3%)
Unknown/Other	425 (7.4%)

	Total
White	4333 (75.1%)
TRANSFER	
Hospital	1152 (20.0%)
No	4611 (79.9%)
Rehab Unit	9 (0.2%)
PRIMARYINSURER	
Commercial	1771 (30.7%)
Medicaid	308 (5.3%)
Medicare	2831 (49.0%)
Military/VA	155 (2.7%)
Non US Insurance	278 (4.8%)
Self Pay	181 (3.1%)
Missing	248 (4.3%)
LIVINGSTATUS	
Home	5710 (98.9%)
Homeless	13 (0.2%)
Nursing home	49 (0.8%)
PREOP_FUNCSTATUS	
Assisted care	122 (2.1%)
Bed bound	10 (0.2%)
Full	3887 (67.3%)
Light work	1114 (19.3%)
Self care	621 (10.8%)
Missing	18 (0.3%)
PRIOR_CVD	
No	5195 (90.0%)
Yes	577 (10.0%)
PRIOR_CAD	
No	4429 (76.7%)
Yes	1343 (23.3%)
PRIOR_CHF	
No	5021 (87.0%)
Yes	751 (13.0%)
COPD	
No	3855 (66.8%)
Yes	1917 (33.2%)
DIABETES	
No	4833 (83.7%)
Yes	938 (16.3%)
Missing	1 (0.0%)
PREOP_DIALYSIS	
No	5586 (96.8%)
Yes	185 (3.2%)
Missing	1 (0.0%)
HTN	
No	628 (10.9%)
Yes	5100 (88.4%)
Missing	44 (0.8%)
PREOP_SMOKING	
No	1171 (20.3%)
Yes	4599 (79.7%)
Missing	2 (0.0%)

	Total
PRIOR_CABG	
No	5000 (86.6%)
Yes	771 (13.4%)
Missing	1 (0.0%)
PRIOR_PCI	
No	4720 (81.8%)
Yes	1049 (18.2%)
Missing	3 (0.1%)
PRIOR_ANEURREP	
No	4530 (78.5%)
Yes	1242 (21.5%)
STRESS	
No	3632 (62.9%)
Yes	2138 (37.0%)
Missing	2 (0.0%)
PREOP_CREAT	
Mean (SD)	1.21 (0.804)
Median [Min, Max]	1.06 [0, 32.0]
Missing	188 (3.3%)
DC_ASA	
No	949 (16.4%)
Yes	4588 (79.5%)
Missing	235 (4.1%)
DC_P2Y	
No	3167 (54.9%)
Yes	2369 (41.0%)
Missing	236 (4.1%)
DC_STATIN	
No	1397 (24.2%)
Yes	4140 (71.7%)
Missing	235 (4.1%)
R_CR_PRESENT	
Mean (SD)	1.60 (0.500)
Median [Min, Max]	2.00 [1.00, 2.00]
Missing	5747 (99.6%)

Operative Variables

Table: A comparison of the operative characteristics for symptomatic versus asymptomatic patients who undergo the F-BEVAR procedure

	Overall
	(N=5772)
PRIOR_AORSURG	
Both	110 (1.9%)
Endo	547 (9.5%)
None	4474 (77.5%)
Open	641 (11.1%)
PRIOR_AORSURG_OPENLOC1	
No	393 (6.8%)
Yes	357 (6.2%)

	Overall
Missing	5022 (87.0%)
PRIOR_AORSURG_OPENLOC2	
No	663 (11.5%)
Yes	87 (1.5%)
Missing	5022 (87.0%)
PRIOR_AORSURG_OPENLOC3	
No	698 (12.1%)
Yes	52 (0.9%)
Missing	5022 (87.0%)
PRIOR_AORSURG_OPENLOC4	
No	413 (7.2%)
Yes	337 (5.8%)
Missing	5022 (87.0%)
PRIOR_AORSURG_ENDOLOC1	
No	578 (10.0%)
Yes	74 (1.3%)
Missing	5120 (88.7%)
PRIOR_AORSURG_ENDOLOC2	
No	393 (6.8%)
Yes	259 (4.5%)
Missing	5120 (88.7%)
PRIOR_AORSURG_ENDOLOC3	
No	604 (10.5%)
Yes	48 (0.8%)
Missing	5120 (88.7%)
PRIOR_AORSURG_ENDOLOC4	
No	298 (5.2%)
Yes	354 (6.1%)
Missing	5120 (88.7%)
PATHOLOGY	
Yes	0 (0%)
No	0 (0%)
Missing	5772 (100%)
PREOP_MAXAAADIA	
Mean (SD)	57.8 (14.2)
Median [Min, Max]	58.0 [0, 150]
Missing	106 (1.8%)
URGENCY	
Yes	0 (0%)
No	0 (0%)
Missing	5772 (100%)
PATHOLOGY_ANEURYSM_TYPE	
Anastomotic	52 (0.9%)
Degenerative, fusiform	3406 (59.0%)
Degenerative, saccular	476 (8.2%)
Intercostal or visceral patch	25 (0.4%)
Prior trauma	7 (0.1%)
Missing	1806 (31.3%)
PATHOLOGY_DISSECT_TYPE	
Acute, <= 30 days	909 (15.7%)
Chronic, >30 daysr	582 (10.1%)
Missing	4281 (74.2%)

	Overall
PATHOLOGY_DISSECT_ONSET_DAYS	
Mean (SD)	-104 (668)
Median [Min, Max]	-4.00 [-16500, 363]
Missing	4742 (82.2%)
Genetic	
No	5548 (96.1%)
Yes	222 (3.8%)
Missing	2 (0.0%)
PROXZONE_DISEASE	
Mean (SD)	5.29 (2.36)
Median [Min, Max]	5.00 [2.00, 9.00]
DISTZONE_DISEASE	
10B	935 (16.2%)
10L	292 (5.1%)
10R	314 (5.4%)
11B	173 (3.0%)
11L	98 (1.7%)
11R	124 (2.1%)
3	48 (0.8%)
4	305 (5.3%)
5	454 (7.9%)
6	189 (3.3%)
7	137 (2.4%)
8	288 (5.0%)
9	2415 (41.8%)
ANESTHESIA	
General	5679 (98.4%)
Local	67 (1.2%)
Regional	26 (0.5%)
CONTRAST	
Mean (SD)	127 (77.6)
Median [Min, Max]	110 [0, 780]
Missing	169 (2.9%)
EBL	
Mean (SD)	376 (629)
Median [Min, Max]	200 [0, 25000]
Missing	91 (1.6%)
FLUOROTIME	
Mean (SD)	57.1 (42.3)
Median [Min, Max]	49.8 [0, 354]
Missing	317 (5.5%)
INTRAOP_PRBC	
Mean (SD)	1.03 (14.2)
Median [Min, Max]	0 [0, 600]
Missing	8 (0.1%)
TOTALPROCTIME	
Mean (SD)	228 (123)
Median [Min, Max]	208 [25.0, 1040]
Missing	4 (0.1%)
IVUSTEE	
Both	255 (4.4%)
IVUS	1825 (31.6%)

	Overall
No	3551 (61.5%)
TEE	127 (2.2%)
Missing	14 (0.2%)
ACCESS_R	
Iliac, via retroperitoneal	51 (0.9%)
None	11 (0.2%)
Open femoral, failed percutanous	119 (2.1%)
Open femoral, transverse	1099 (19.0%)
Open femoral, vertical	440 (7.6%)
Percutaneous femoral	3534 (61.2%)
Missing	518 (9.0%)
ACCESS_L	
Iliac, via retroperitoneal	29 (0.5%)
None	16 (0.3%)
Open femoral, failed percutanous	68 (1.2%)
Open femoral, transverse	792 (13.7%)
Open femoral, vertical	336 (5.8%)
Percutaneous femoral	3262 (56.5%)
Missing	1269 (22.0%)
LRGST_SHEATH_SIZE_R	
Mean (SD)	18.6 (4.08)
Median [Min, Max]	20.0 [5.00, 28.0]
Missing	4750 (82.3%)
LRGST_SHEATH_SIZE_L	
Mean (SD)	16.9 (5.16)
Median [Min, Max]	18.0 [5.00, 26.0]
Missing	4948 (85.7%)
ARMNECK_ACCESS	
For both	449 (7.8%)
For branch treatment	1259 (21.8%)
For femoral-brachial wire	376 (6.5%)
No	3683 (63.8%)
Missing	5 (0.1%)
ARMNECK_ACCESS_LOC	
Left arm	1023 (17.7%)
Left axillary	548 (9.5%)
Left carotid	73 (1.3%)
Multiple	77 (1.3%)
Right arm	204 (3.5%)
Right axillary	152 (2.6%)
Right carotid	3 (0.1%)
Missing	3692 (64.0%)
AORDEV_NUM	
Mean (SD)	2.20 (1.02)
Median [Min, Max]	2.00 [1.00, 6.00]
AORDEV_CMOD	
No	3100 (53.7%)
Yes	2672 (46.3%)
STAGEDAORTRT	
No	5051 (87.5%)
Yes	302 (5.2%)
Missing	419 (7.3%)

	Overall
DEV1_GTYPE	
Custom	1597 (27.7%)
Physician modified	570 (9.9%)
Standard	500 (8.7%)
Missing	3105 (53.8%)
DEV2_GTYPE	
Custom	921 (16.0%)
Physician modified	214 (3.7%)
Standard	1167 (20.2%)
Missing	3470 (60.1%)
DEV3_GTYPE	
Custom	136 (2.4%)
Physician modified	71 (1.2%)
Standard	503 (8.7%)
Missing	5062 (87.7%)
DEV1_PROXZONE	
Mean (SD)	4.85 (2.29)
Median [Min, Max]	5.00 [0, 9.00]
Missing	45 (0.8%)
DEV2_PROXZONE	
Mean (SD)	6.67 (2.51)
Median [Min, Max]	8.00 [0, 9.00]
Missing	1327 (23.0%)
DEV3_PROXZONE	
Mean (SD)	6.39 (2.32)
Median [Min, Max]	6.00 [0, 9.00]
Missing	4299 (74.5%)
DEV4_PROXZONE	
Mean (SD)	7.06 (2.17)
Median [Min, Max]	8.00 [0, 9.00]
Missing	5193 (90.0%)
DEV5_PROXZONE	
Mean (SD)	7.14 (1.99)
Median [Min, Max]	8.00 [3.00, 9.00]
Missing	5571 (96.5%)
DEV6_PROXZONE	
Mean (SD)	7.00 (1.95)
Median [Min, Max]	7.00 [2.00, 9.00]
Missing	5688 (98.5%)
DEV1_DISTZONE	
0	1 (0.0%)
1	1 (0.0%)
10B	294 (5.1%)
10L	27 (0.5%)
10R	37 (0.6%)
11B	10 (0.2%)
11L	3 (0.1%)
11R	5 (0.1%)
2	26 (0.5%)
3	194 (3.4%)
4	1302 (22.6%)
5	749 (13.0%)

	Overall
6	179 (3.1%)
7	97 (1.7%)
8	313 (5.4%)
9	2463 (42.7%)
Missing	71 (1.2%)
DEV2_DISTZONE	
10B	1076 (18.6%)
10L	260 (4.5%)
10R	320 (5.5%)
11B	17 (0.3%)
11L	10 (0.2%)
11R	21 (0.4%)
2	12 (0.2%)
3	34 (0.6%)
4	325 (5.6%)
5	932 (16.1%)
6	165 (2.9%)
7	99 (1.7%)
8	132 (2.3%)
9	1062 (18.4%)
Missing	1307 (22.6%)
DEV3_DISTZONE	
1	2 (0.0%)
10B	109 (1.9%)
10L	118 (2.0%)
10R	154 (2.7%)
11B	5 (0.1%)
11L	4 (0.1%)
11R	20 (0.3%)
2	8 (0.1%)
3	17 (0.3%)
4	59 (1.0%)
5	305 (5.3%)
6	106 (1.8%)
7	74 (1.3%)
8	81 (1.4%)
9	412 (7.1%)
Missing	4298 (74.5%)
DEV4_DISTZONE	
10B	53 (0.9%)
10L	79 (1.4%)
10R	77 (1.3%)
11L	11 (0.2%)
11R	6 (0.1%)
2	3 (0.1%)
3	5 (0.1%)
4	17 (0.3%)
5	65 (1.1%)
6	24 (0.4%)
7	19 (0.3%)
8	43 (0.7%)
9	175 (3.0%)

	Overall
Missing	5195 (90.0%)
DEV5_DISTZONE	
10B	19 (0.3%)
10L	23 (0.4%)
10R	17 (0.3%)
11L	2 (0.0%)
11R	6 (0.1%)
4	3 (0.1%)
5	28 (0.5%)
6	7 (0.1%)
7	14 (0.2%)
8	11 (0.2%)
9	70 (1.2%)
Missing	5572 (96.5%)
DEV6_DISTZONE	
10B	8 (0.1%)
10L	7 (0.1%)
10R	6 (0.1%)
11L	4 (0.1%)
11R	1 (0.0%)
4	1 (0.0%)
5	10 (0.2%)
6	8 (0.1%)
7	5 (0.1%)
8	7 (0.1%)
9	27 (0.5%)
Missing	5688 (98.5%)
ILIACDEV_END_R	
Common	1968 (34.1%)
External, Unintended	24 (0.4%)
External,Intended	269 (4.7%)
None	31 (0.5%)
Missing	3480 (60.3%)
ILIACDEV_END_L	
Common	2004 (34.7%)
External, Unintended	13 (0.2%)
External,Intended	208 (3.6%)
None	33 (0.6%)
Missing	3514 (60.9%)
BRANCH_STAGED	
No	5293 (91.7%)
Yes	472 (8.2%)
Missing	7 (0.1%)
BRANCH_LSUB	
No	4008 (69.4%)
Yes	1764 (30.6%)
BRANCH_CELIAC	
No	2320 (40.2%)
Yes	3452 (59.8%)
BRANCH_SMA	
No	1461 (25.3%)
Yes	4311 (74.7%)

	Overall
BRANCH_RRENAL	
No	1060 (18.4%)
Yes	4712 (81.6%)
BRANCH_LRENAL	
No	1060 (18.4%)
Yes	4712 (81.6%)
BRANCH_INNO_POST	
Patent	34 (0.6%)
Stenosis/Partial Coverage > 50%	1 (0.0%)
Missing	5737 (99.4%)
BRANCH_LSUB_VERTPAT	
Not imaged	722 (12.5%)
Occluded bilat	3 (0.1%)
Occluded L, patent R	29 (0.5%)
Occluded R, patent L	4 (0.1%)
Patent bilat	932 (16.1%)
Patent bilat, L dominant	20 (0.3%)
Patent bilat, R dominant	38 (0.7%)
Missing	4024 (69.7%)
ANESTHESIA_GEN_TIMEEXT	
<12 hrs	421 (7.3%)
>24 hrs	356 (6.2%)
12-24 hrs	272 (4.7%)
In OR	4612 (79.9%)
Missing	111 (1.9%)
POSTOP_SPINALDRAIN	
None	3852 (66.7%)
Post-op for spinal ischemia	79 (1.4%)
Post-op, prophylactic	73 (1.3%)
Pre-op	1767 (30.6%)
Missing	1 (0.0%)
R_CELIAC	
Chimney	2 (0.0%)
Fen/scallop Only	7 (0.1%)
Fenestrated Stentgraft Branch (Branched TEVAR)	14 (0.2%)
Patent, no intervention	79 (1.4%)
Purposely Occluded	1 (0.0%)
Stented-fen	3 (0.1%)
Missing	5666 (98.2%)
R_DISTATTZONE	
Mean (SD)	6.87 (3.48)
Median [Min, Max]	8.00 [1.00, 11.0]
Missing	5680 (98.4%)
R_GDPROXIMAL	
Mean (SD)	32.4 (4.42)
Median [Min, Max]	32.0 [20.0, 45.0]
Missing	5666 (98.2%)
R_GRFTCONFIG	
Branched/fenestrated	68 (1.2%)
Plus Bare Stent	5 (0.1%)
Standard	25 (0.4%)
Missing	5674 (98.3%)

	Overall
R_LT_RENAL	
Chimney	1 (0.0%)
Fenestrated Stentgraft Branch (Branched TEVAR)	17 (0.3%)
Patent, no intervention	36 (0.6%)
Purposely Occluded	4 (0.1%)
Stent Only	2 (0.0%)
Stented-fen	46 (0.8%)
Missing	5666 (98.2%)
R_PRATTZONE	
Mean (SD)	3.97 (2.57)
Median [Min, Max]	3.00 [1.00, 8.00]
Missing	5677 (98.4%)
R_RT_RENAL	
Chimney	1 (0.0%)
Chronically Occluded	5 (0.1%)
Fenestrated Stentgraft Branch (Branched TEVAR)	17 (0.3%)
Patent, no intervention	36 (0.6%)
Stent Only	2 (0.0%)
Stented-fen	45 (0.8%)
Missing	5666 (98.2%)
R_SMA	
Chimney	2 (0.0%)
Fen/scallop Only	33 (0.6%)
Fenestrated Stentgraft Branch (Branched TEVAR)	14 (0.2%)
Patent, no intervention	45 (0.8%)
Stented-fen	12 (0.2%)
Missing	5666 (98.2%)
R_SPINAL_DRAIN	
No Drain	70 (1.2%)
Post-op Drain	2 (0.0%)
Pre-op Drain	34 (0.6%)
Missing	5666 (98.2%)
factor(lrenal)	
0	1269 (22.0%)
1	2770 (48.0%)
2	248 (4.3%)
3	388 (6.7%)
Missing	1097 (19.0%)
factor(rrenal)	
0	1413 (24.5%)
1	2639 (45.7%)
2	198 (3.4%)
3	303 (5.2%)
Missing	1219 (21.1%)
factor(sma)	
0	1304 (22.6%)
1	2562 (44.4%)
2	62 (1.1%)
3	336 (5.8%)
Missing	1508 (26.1%)
factor(celiac)	
0	1371 (23.8%)

	Overall
1	1397 (24.2%)
2	471 (8.2%)
3	189 (3.3%)
Missing	2344 (40.6%)
factor(lsub)	
0	40 (0.7%)
1	224 (3.9%)
2	1334 (23.1%)
3	95 (1.6%)
Missing	4079 (70.7%)

Outcomes

Table 3: A comparison of the long term follow-up outcomes for symptomatic versus asymptomatic patients who undergo the F-BEVAR procedure

	Overall
	(N=5772)
DEAD	
Mean (SD)	0.149 (0.356)
Median [Min, Max]	0 [0, 1.00]
PROC_SURVIVALDAYS	
Mean (SD)	813 (802)
Median [Min, Max]	508 [-355, 3390]

Table 3: A comparison of the procedure outcomes for symptomatic versus asymptomatic patients who undergo the F-BEVAR procedure

	Overall
	(N=5772)
TOTAL_LOS	
Mean (SD)	8.86 (22.8)
Median [Min, Max]	5.00 [0, 738]
POSTOP_LOS	
Mean (SD)	7.03 (16.5)
Median [Min, Max]	4.00 [0, 375]
AORDEV_TECHSUCC	
No	190 (3.3%)
Yes	4773 (82.7%)
Missing	809 (14.0%)
CONVTOOPEN	
No	5744 (99.5%)
Yes	28 (0.5%)
R_ENDOLEAK_AT_COMPLETION	
Attachment Site (type I)	14 (0.2%)
Branch (type II)	1 (0.0%)
Mid Graft (type III)	1 (0.0%)
No	90 (1.6%)
Missing	5666 (98.2%)
BRANCH_LSUB_POST	

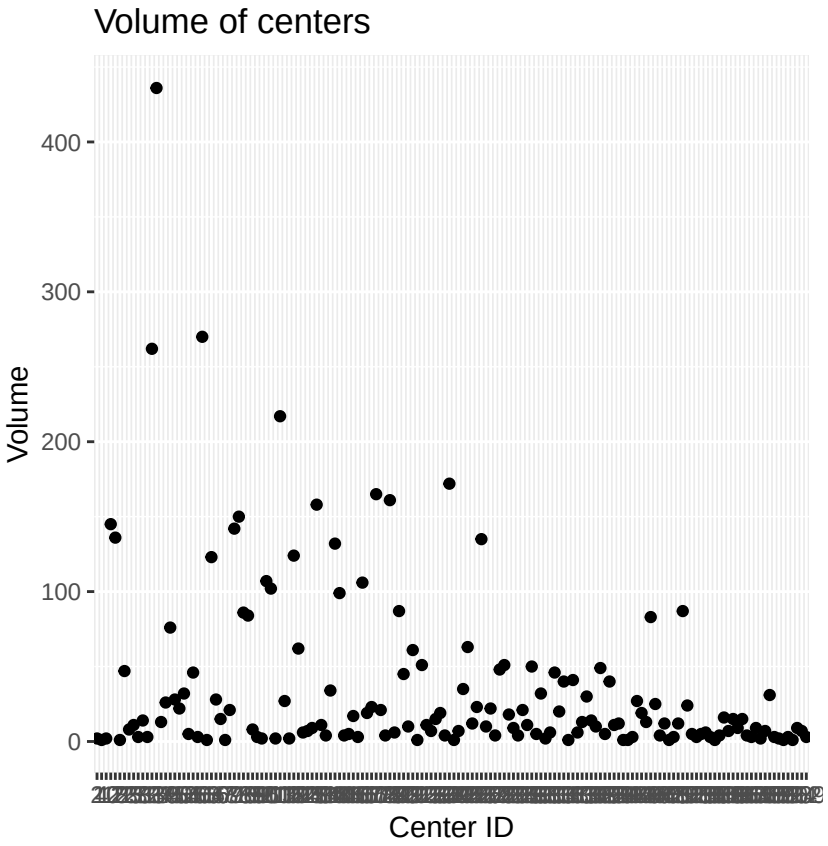
	Overall
Occluded	798 (13.8%)
Patent	723 (12.5%)
Stenosis/Partial Coverage > 50%	231 (4.0%)
Missing	4020 (69.6%)
BRANCH_CELIAC_POST	
Occluded	410 (7.1%)
Patent	2947 (51.1%)
Stenosis/Partial Coverage > 50%	68 (1.2%)
Missing	2347 (40.7%)
BRANCH_SMA_POST	
Occluded	27 (0.5%)
Patent	4238 (73.4%)
Stenosis/Partial Coverage > 50%	23 (0.4%)
Missing	1484 (25.7%)
BRANCH_RRENAL_POST	
Occluded	208 (3.6%)
Patent	4453 (77.1%)
Stenosis/Partial Coverage > 50%	27 (0.5%)
Missing	1084 (18.8%)
BRANCH_LRENAL_POST	
Occluded	304 (5.3%)
Patent	4340 (75.2%)
Stenosis/Partial Coverage > 50%	44 (0.8%)
Missing	1084 (18.8%)
BRANCH_RCOMILI_POST	
Occluded	26 (0.5%)
Patent	3183 (55.1%)
Stenosis/Partial Coverage > 50%	10 (0.2%)
Missing	2553 (44.2%)
BRANCH_LCOMILI_POST	
Occluded	44 (0.8%)
Patent	2771 (48.0%)
Stenosis/Partial Coverage > 50%	12 (0.2%)
Missing	2945 (51.0%)
ICUSTAY	
Mean (SD)	3.47 (5.55)
Median [Min, Max]	2.00 [0, 85.0]
Missing	9 (0.2%)
POSTOP_PRBC	
Mean (SD)	1.41 (3.86)
Median [Min, Max]	0 [0, 77.0]
Missing	10 (0.2%)
POSTOP_VASO	
No	4323 (74.9%)
Yes	1440 (24.9%)
Missing	9 (0.2%)
POSTOP_HIGHCREAT	
Mean (SD)	1.67 (1.61)
Median [Min, Max]	1.20 [0, 16.9]
Missing	30 (0.5%)
POSTOP_COMPLICATIONS	
No	4335 (75.1%)

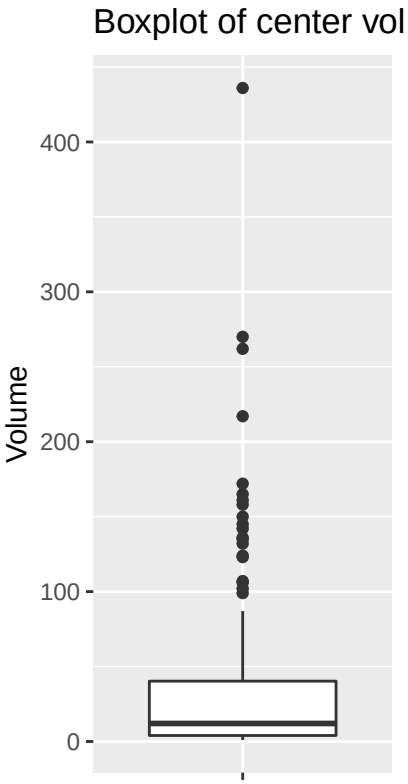
	Overall
Yes	1436 (24.9%)
Missing	1 (0.0%)
R_POSTOP_HEMATOMA	
Minor	84 (1.5%)
No	3909 (67.7%)
Surgical Rx	39 (0.7%)
Thrombin injection	9 (0.2%)
Transfusion	19 (0.3%)
Missing	1712 (29.7%)
R_POSTOP_SITEOCC	
Interventional Rx	8 (0.1%)
Medical Rx	2 (0.0%)
No	4677 (81.0%)
Surgical Rx	34 (0.6%)
Missing	1051 (18.2%)
POSTOP_MI	
EKG or clinical	91 (1.6%)
No	5567 (96.4%)
Troponin only	113 (2.0%)
Missing	1 (0.0%)
POSTOP_DYSRHYTHMIA	
No	5348 (92.7%)
Yes	424 (7.3%)
POSTOP_CHF	
No	5657 (98.0%)
Yes	115 (2.0%)
POSTOP_CEREBROSX	
Mean (SD)	0.159 (0.937)
Median [Min, Max]	0 [0, 7.00]
Missing	2 (0.0%)
POSTOP_RESPIRATORY	
No	5372 (93.1%)
Yes	400 (6.9%)
POSTOP_DIALYSIS	
No	5440 (94.2%)
Yes	172 (3.0%)
Missing	160 (2.8%)
POSTOP_ARMEMBO	
No	5724 (99.2%)
Yes	48 (0.8%)
POSTOP_LEGEMBO	
No	5642 (97.7%)
Yes	130 (2.3%)
POSTOP_LEGCOMPART	
No	5708 (98.9%)
Yes	64 (1.1%)
POSTOP_INTISCH	
Mean (SD)	0.0629 (0.444)
Median [Min, Max]	0 [0, 4.00]
Missing	1 (0.0%)
R_POSTOP_BOWELISCH	
No	98 (1.7%)

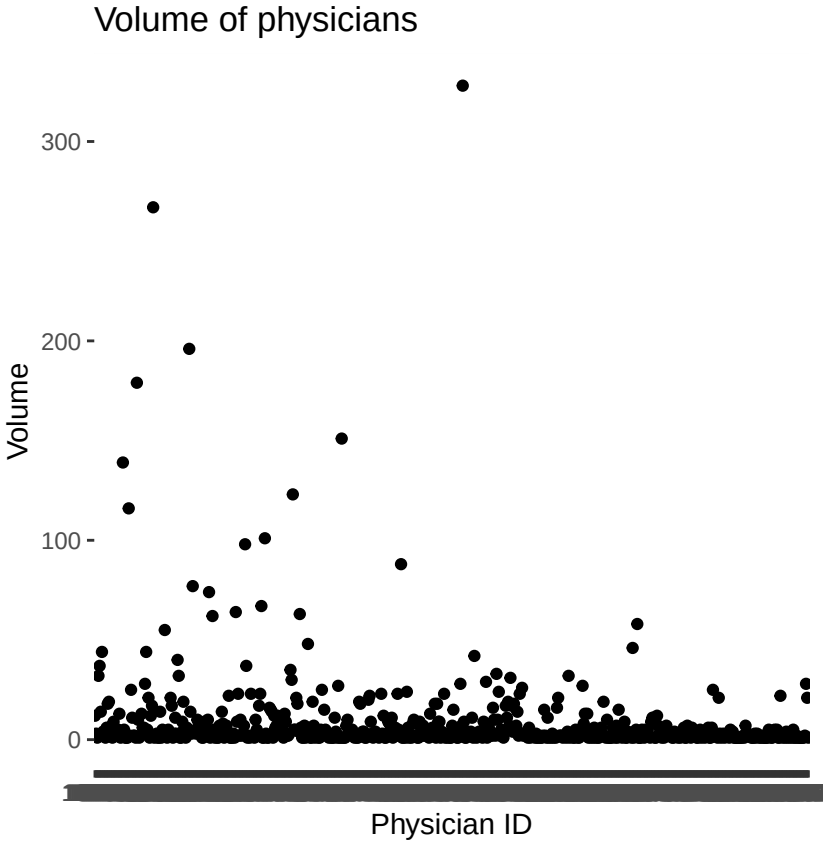
	Overall
Yes	8 (0.1%)
Missing	5666 (98.2%)
POSTOP_RENALISCH	
No	5570 (96.5%)
Yes	202 (3.5%)
R_POSTOP_SSI	
No	4701 (81.4%)
Yes	20 (0.3%)
Missing	1051 (18.2%)
POSTOP_SPINAL_ISCHEMIA	
No	5535 (95.9%)
Yes	237 (4.1%)
RETX	
No	5249 (90.9%)
Yes	521 (9.0%)
Missing	2 (0.0%)
DC_STATUS	
Dead	232 (4.0%)
Home	4584 (79.4%)
Homeless	2 (0.0%)
Nursing Home	252 (4.4%)
Other Hospital	98 (1.7%)
Rehab Unit	604 (10.5%)
R_LE_ISCH	
No	31 (0.5%)
Yes	2 (0.0%)
Missing	5739 (99.4%)
R_POSTOP_RENAL	
No	94 (1.6%)
Yes	12 (0.2%)
Missing	5666 (98.2%)
R_RTOR	
No	100 (1.7%)
Yes	7 (0.1%)
Missing	5665 (98.1%)

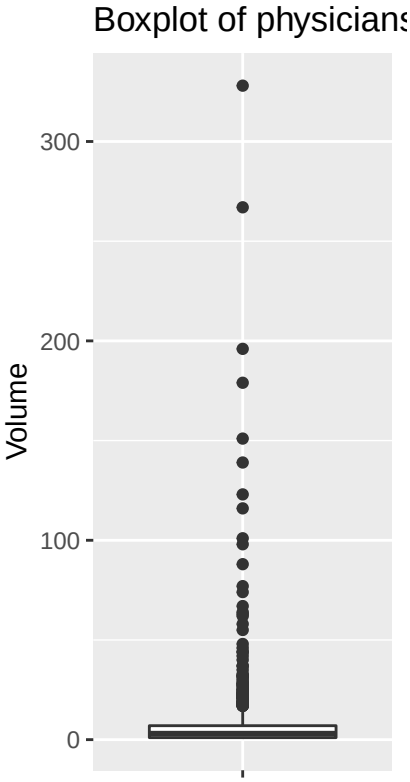
Volume Variables

Volume Variables: `REGIONID`, `CENTERID`, `PHYSICIANID`


Volume of centers
Volume
400
300
200
100
0
Center ID


Boxplot of center vol
Volume
400
300
200
100
0


Volume of physicians
Volume
300
200
100
0
Physician ID


Boxplot of physicians
Volume
300
200
100
0

19 regions, 156 centers, 614 physicians.

Quantiles of centers' volume: 1, 4, 12, 40.25, 436

Quantiles of physicians' volume: 1, 1, 3, 7, 328

how to do cluster on centers and physicians

Define high volume center/physician based on the quantile from violin plot and account for that in a multivariable model.

mean and median: based on outliners?

Code Appendix

```
knitr::opts_chunk$set(echo = FALSE,message = FALSE,warning = FALSE)
library(tidyverse)
library(table1)
library(Hmisc)
library(ggplot2)
library(ggpubr)
## ------------- working directories for Lily ----------
wd_lily = '/Users/hanyiwang/Desktop/Comparative-analysis-of-treatments-of-CAA'
path_lily = c("../data/FBVAR.csv")


## ------------- working directories for Jenn ----------
#wd_jenn = '/Users/jenniferci/Desktop/Comparative-analysis-of-treatments-of-CAA'
#path_jenn = c(
#  "/Users/jenniferci/Desktop/Comparative-analysis-of-treatments-of-CAA/TEVAR_International_20210712/TE
#  "/Users/jenniferci/Desktop/Comparative-analysis-of-treatments-of-CAA/TEVAR_International_20210712/TE
#  "/Users/jenniferci/Desktop/Comparative-analysis-of-treatments-of-CAA/TEVAR_International_20210901/TE
#  "/Users/jenniferci/Desktop/Comparative-analysis-of-treatments-of-CAA/TEVAR_International_20210901/TE

## ------------- read data ----------
setwd(wd_lily)
FBVAR = read.csv(path_lily)

#setwd(wd_jenn)
#TEVAR_LTF_07 = read.csv(path_jenn[1])
#TEVAR_PROC_07 = read.csv(path_jenn[2])
#TEVAR_LTF_09 = read.csv(path_jenn[3])
#TEVAR_PROC_09 = read.csv(path_jenn[4])
## ------------- population of interest ----------
table1(~  PRESENTATION, data = FBVAR)
## ------------- table: Patient demographic and co-morbidities----------

table1(~ R_PREOP_AMBUL+AGE+AGECAT+GENDER+ETHNICITY+ RACE+TRANSFER+PRIMARYINSURER+
         LIVINGSTATUS+ PREOP_FUNCSTATUS+PRIOR_CVD +PRIOR_CAD+PRIOR_CHF+COPD+
         DIABETES+PREOP_DIALYSIS+HTN+ PREOP_SMOKING+PRIOR_CABG+PRIOR_PCI+PRIOR_ANEURREP+
         STRESS+PREOP_CREAT+DC_ASA+DC_P2Y+DC_STATIN+R_CR_PRESENT
         | PRESENTATION, data = FBVAR,overall="Total")
## ------------- table:  Operative Variables----------
table1(~ PRIOR_AORSURG+
         PRIOR_AORSURG_OPENLOC1+PRIOR_AORSURG_OPENLOC2+PRIOR_AORSURG_OPENLOC3+PRIOR_AORSURG_OPENLOC4+
         PRIOR_AORSURG_ENDOLOC1+PRIOR_AORSURG_ENDOLOC2+PRIOR_AORSURG_ENDOLOC3+PRIOR_AORSURG_ENDOLOC4+
         PATHOLOGY+PREOP_MAXAAADIA+URGENCY+
         PATHOLOGY_ANEURYSM_TYPE+PATHOLOGY_DISSECT_TYPE+PATHOLOGY_DISSECT_ONSET_DAYS+
         Genetic+
         PROXZONE_DISEASE+DISTZONE_DISEASE+
         ANESTHESIA+CONTRAST+EBL+FLUOROTIME+INTRAOP_PRBC+TOTALPROCTIME+IVUSTEE+ACCESS_R+ACCESS_L+
         LRGST_SHEATH_SIZE_R+LRGST_SHEATH_SIZE_L+ARMNECK_ACCESS+ARMNECK_ACCESS_LOC+
         AORDEV_NUM+AORDEV_CMOD+STAGEDAORTRT+DEV1_GTYPE+DEV2_GTYPE+DEV3_GTYPE+
         DEV1_PROXZONE+DEV2_PROXZONE+DEV3_PROXZONE+DEV4_PROXZONE+DEV5_PROXZONE+DEV6_PROXZONE+
         DEV1_DISTZONE+DEV2_DISTZONE+DEV3_DISTZONE+DEV4_DISTZONE+DEV5_DISTZONE+DEV6_DISTZONE+
         ILIACDEV_END_R+ILIACDEV_END_L+
         BRANCH_STAGED+BRANCH_LSUB+BRANCH_CELIAC+BRANCH_SMA+BRANCH_RRENAL+BRANCH_LRENAL+
```

```
         BRANCH_INNO_POST+
         BRANCH_LSUB_VERTPAT+ANESTHESIA_GEN_TIMEEXT+POSTOP_SPINALDRAIN+
         R_CELIAC+R_DISTATTZONE+R_GDPROXIMAL+R_GRFTCONFIG+
         R_LT_RENAL+R_PRATTZONE+R_RT_RENAL+R_SMA+R_SPINAL_DRAIN+
         factor(lrenal)+factor(rrenal)+factor(sma)+factor(celiac)+factor(lsub)
       | PRESENTATION, data = FBVAR)

## ------------- table: primary outcomes----------
table1(~ DEAD+PROC_SURVIVALDAYS | PRESENTATION, data = FBVAR)
## ------------- table: secondary outcomes----------
table1(~ TOTAL_LOS+POSTOP_LOS+
         AORDEV_TECHSUCC+CONVTOOPEN+R_ENDOLEAK_AT_COMPLETION+
         BRANCH_LSUB_POST+BRANCH_CELIAC_POST+BRANCH_SMA_POST+BRANCH_RRENAL_POST+
         BRANCH_LRENAL_POST+BRANCH_RCOMILI_POST+BRANCH_LCOMILI_POST+ICUSTAY+
         POSTOP_PRBC+POSTOP_VASO+POSTOP_HIGHCREAT+POSTOP_COMPLICATIONS+
         R_POSTOP_HEMATOMA+R_POSTOP_SITEOCC+
         POSTOP_MI+POSTOP_DYSRHYTHMIA+POSTOP_CHF+POSTOP_CEREBROSX+POSTOP_RESPIRATORY+
         POSTOP_DIALYSIS+POSTOP_ARMEMBO+POSTOP_LEGEMBO+POSTOP_LEGCOMPART+POSTOP_INTISCH+
         R_POSTOP_BOWELISCH+POSTOP_RENALISCH+R_POSTOP_SSI+POSTOP_SPINAL_ISCHEMIA+
         RETX+DC_STATUS+R_LE_ISCH+R_POSTOP_RENAL+R_RTOR
       | PRESENTATION, data = FBVAR)

## ------------- Survival curves----------

## ------------- clustering variables----------

#FBVAR %>% select(REGIONID) %>% table()
#FBVAR %>% select(CENTERID) %>% table()
#FBVAR %>% select(PHYSICIANID) %>% table()

## ------------- plots of volume----------
center_vol = as.data.frame(FBVAR %>% select(CENTERID) %>% table())
phys_vol = as.data.frame(FBVAR %>% select(PHYSICIANID) %>% table())

p1 = ggplot(data = center_vol, aes(x=CENTERID, y=Freq)) +
  geom_point() +
  labs(title = 'Volume of centers',x='Center ID',y='Volume')

p2 = ggplot(data = center_vol, aes(x='', y=Freq)) +
  geom_boxplot() +
  labs(title = 'Boxplot of center volumes',x='',y='Volume')

print(ggarrange(p1, p2, widths = c(20,10),ncol = 2, nrow = 1, align = "h"))

p3 = ggplot(data = phys_vol, aes(x=PHYSICIANID, y=Freq)) +
  geom_point() +
  labs(title = 'Volume of physicians',x='Physician ID',y='Volume')

p4 = ggplot(data = phys_vol, aes(x='', y=Freq)) +
  geom_boxplot() +
  labs(title = 'Boxplot of physicians volumes',x='',y='Volume')

print(ggarrange(p3, p4, widths = c(20,10),ncol = 2, nrow = 1, align = "h"))
```