

Descriptive Statistics for the VQI FBVAR Dataset

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population of interest: the asymptomatic and symptomatics groups.

Overall	
(N=3510)	
PRESENTATION	
Asymptomatic	3026 (86.2%)
Symptomatic	484 (13.8%)

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

	Asymptomatic (N=3026)	Symptomatic (N=484)	Total (N=3510)
AGE			
Mean (SD)	73.1 (8.31)	68.1 (11.7)	72.4 (9.02)
Median [Min, Max]	74.0 [0, 90.0]	70.0 [33.0, 90.0]	73.0 [0, 90.0]
AGECAT			
<40	4 (0.1%)	15 (3.1%)	19 (0.5%)
>89	26 (0.9%)	5 (1.0%)	31 (0.9%)
40-49	27 (0.9%)	19 (3.9%)	46 (1.3%)
50-59	122 (4.0%)	59 (12.2%)	181 (5.2%)
60-69	762 (25.2%)	144 (29.8%)	906 (25.8%)
70-79	1454 (48.1%)	175 (36.2%)	1629 (46.4%)
80-89	631 (20.9%)	67 (13.8%)	698 (19.9%)
GENDER			
female	704 (23.3%)	184 (38.0%)	888 (25.3%)
male	2322 (76.7%)	300 (62.0%)	2622 (74.7%)
ETHNICITY			
Hispanic or Latino	122 (4.0%)	20 (4.1%)	142 (4.0%)
None Hispanic or Latino	2900 (95.8%)	464 (95.9%)	3364 (95.8%)
Missing	4 (0.1%)	0 (0%)	4 (0.1%)
RACE			
American Indian or Alaskan Native	6 (0.2%)	1 (0.2%)	7 (0.2%)
Asian	71 (2.3%)	10 (2.1%)	81 (2.3%)
Black or African American	215 (7.1%)	109 (22.5%)	324 (9.2%)
More than 1 race	3 (0.1%)	2 (0.4%)	5 (0.1%)
Native Hawaiian or other Pacific Islander	4 (0.1%)	2 (0.4%)	6 (0.2%)
Unknown/Other	205 (6.8%)	41 (8.5%)	246 (7.0%)
White	2522 (83.3%)	319 (65.9%)	2841 (80.9%)
TRANSFER			

	Asymptomatic	Symptomatic	Total
Hospital	39 (1.3%)	238 (49.2%)	277 (7.9%)
No	2985 (98.6%)	245 (50.6%)	3230 (92.0%)
Rehab Unit	2 (0.1%)	1 (0.2%)	3 (0.1%)
PRIMARYINSURER			
Commercial	846 (28.0%)	168 (34.7%)	1014 (28.9%)
Medicaid	63 (2.1%)	40 (8.3%)	103 (2.9%)
Medicare	1675 (55.4%)	214 (44.2%)	1889 (53.8%)
Military/VA	93 (3.1%)	12 (2.5%)	105 (3.0%)
Non US Insurance	207 (6.8%)	12 (2.5%)	219 (6.2%)
Self Pay	15 (0.5%)	17 (3.5%)	32 (0.9%)
Missing	127 (4.2%)	21 (4.3%)	148 (4.2%)
LIVINGSTATUS			
Home	3003 (99.2%)	477 (98.6%)	3480 (99.1%)
Homeless	2 (0.1%)	1 (0.2%)	3 (0.1%)
Nursing home	21 (0.7%)	6 (1.2%)	27 (0.8%)
PREOP_FUNCSTATUS			
Assisted care	49 (1.6%)	18 (3.7%)	67 (1.9%)
Bed bound	4 (0.1%)	1 (0.2%)	5 (0.1%)
Full	2023 (66.9%)	305 (63.0%)	2328 (66.3%)
Light work	643 (21.2%)	105 (21.7%)	748 (21.3%)
Self care	306 (10.1%)	54 (11.2%)	360 (10.3%)
Missing	1 (0.0%)	1 (0.2%)	2 (0.1%)
PRIOR_CVD			
No	2724 (90.0%)	426 (88.0%)	3150 (89.7%)
Yes	302 (10.0%)	58 (12.0%)	360 (10.3%)
PRIOR_CAD			
No	2188 (72.3%)	345 (71.3%)	2533 (72.2%)
Yes	838 (27.7%)	139 (28.7%)	977 (27.8%)
PRIOR_CHF			
No	2640 (87.2%)	408 (84.3%)	3048 (86.8%)
Yes	386 (12.8%)	76 (15.7%)	462 (13.2%)
COPD			
No	1893 (62.6%)	305 (63.0%)	2198 (62.6%)
Yes	1133 (37.4%)	179 (37.0%)	1312 (37.4%)
DIABETES			
No	2477 (81.9%)	397 (82.0%)	2874 (81.9%)
Yes	549 (18.1%)	87 (18.0%)	636 (18.1%)
PREOP_DIALYSIS			
No	2980 (98.5%)	453 (93.6%)	3433 (97.8%)
Yes	46 (1.5%)	31 (6.4%)	77 (2.2%)
HTN			
No	340 (11.2%)	42 (8.7%)	382 (10.9%)
Yes	2679 (88.5%)	439 (90.7%)	3118 (88.8%)
Missing	7 (0.2%)	3 (0.6%)	10 (0.3%)
PREOP_SMOKING			
No	388 (12.8%)	108 (22.3%)	496 (14.1%)
Yes	2638 (87.2%)	376 (77.7%)	3014 (85.9%)
PRIOR_CABG			
No	2515 (83.1%)	419 (86.6%)	2934 (83.6%)
Yes	510 (16.9%)	65 (13.4%)	575 (16.4%)
Missing	1 (0.0%)	0 (0%)	1 (0.0%)
PRIOR_PCI			

	Asymptomatic	Symptomatic	Total
No	2317 (76.6%)	403 (83.3%)	2720 (77.5%)
Yes	707 (23.4%)	81 (16.7%)	788 (22.5%)
Missing	2 (0.1%)	0 (0%)	2 (0.1%)
PRIOR_ANEURREP			
No	2370 (78.3%)	351 (72.5%)	2721 (77.5%)
Yes	656 (21.7%)	133 (27.5%)	789 (22.5%)
STRESS			
No	1519 (50.2%)	385 (79.5%)	1904 (54.2%)
Yes	1505 (49.7%)	99 (20.5%)	1604 (45.7%)
Missing	2 (0.1%)	0 (0%)	2 (0.1%)
PREOP_CREAT			
Mean (SD)	1.18 (0.624)	1.20 (0.776)	1.18 (0.646)
Median [Min, Max]	1.08 [0, 14.4]	1.00 [0.300, 7.50]	1.07 [0, 14.4]
Missing	60 (2.0%)	23 (4.8%)	83 (2.4%)
DC_ASA			
No	429 (14.2%)	78 (16.1%)	507 (14.4%)
Yes	2527 (83.5%)	383 (79.1%)	2910 (82.9%)
Missing	70 (2.3%)	23 (4.8%)	93 (2.6%)
DC_P2Y			
No	1333 (44.1%)	265 (54.8%)	1598 (45.5%)
Yes	1622 (53.6%)	196 (40.5%)	1818 (51.8%)
Missing	71 (2.3%)	23 (4.8%)	94 (2.7%)
DC_STATIN			
No	536 (17.7%)	102 (21.1%)	638 (18.2%)
Yes	2420 (80.0%)	359 (74.2%)	2779 (79.2%)
Missing	70 (2.3%)	23 (4.8%)	93 (2.6%)

Operative Variables

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

	Asymptomatic	Symptomatic	Overall
	(N=3026)	(N=484)	(N=3510)
PRIOR_AORSURG			
Both	75 (2.5%)	12 (2.5%)	87 (2.5%)
Endo	292 (9.6%)	73 (15.1%)	365 (10.4%)
None	2372 (78.4%)	348 (71.9%)	2720 (77.5%)
Open	287 (9.5%)	51 (10.5%)	338 (9.6%)
PATHOLOGY			
Aneurysm	2826 (93.4%)	314 (64.9%)	3140 (89.5%)
Aneurysm from dissection	109 (3.6%)	37 (7.6%)	146 (4.2%)
Dissection	55 (1.8%)	100 (20.7%)	155 (4.4%)
PAU/IMH	36 (1.2%)	33 (6.8%)	69 (2.0%)
PREOP_MAXAAADIA			
Mean (SD)	60.8 (10.7)	61.6 (18.6)	60.9 (12.1)
Median [Min, Max]	60.0 [5.00, 130]	60.0 [5.50, 126]	60.0 [5.00, 130]
Missing	13 (0.4%)	13 (2.7%)	26 (0.7%)
URGENCY			
Elective	2989 (98.8%)	243 (50.2%)	3232 (92.1%)
Emergent	2 (0.1%)	55 (11.4%)	57 (1.6%)

	Asymptomatic	Symptomatic	Overall
Urgent	35 (1.2%)	186 (38.4%)	221 (6.3%)
PATHOLOGY_ANEURYSM_TYPE			
Anastomotic	39 (1.3%)	6 (1.2%)	45 (1.3%)
Degenerative, fusiform	2453 (81.1%)	264 (54.5%)	2717 (77.4%)
Degenerative, saccular	270 (8.9%)	35 (7.2%)	305 (8.7%)
Intercostal or visceral patch	16 (0.5%)	1 (0.2%)	17 (0.5%)
Prior trauma	1 (0.0%)	3 (0.6%)	4 (0.1%)
Missing	247 (8.2%)	175 (36.2%)	422 (12.0%)
PATHOLOGY_DISSECT_TYPE			
Acute, <= 30 days	10 (0.3%)	85 (17.6%)	95 (2.7%)
Chronic, >30 days	154 (5.1%)	52 (10.7%)	206 (5.9%)
Missing	2862 (94.6%)	347 (71.7%)	3209 (91.4%)
PATHOLOGY_DISSECT_ONSET_DAYS			
Mean (SD)	NA (NA)	-298 (1650)	-298 (1650)
Median [Min, Max]	NA [NA, NA]	-6.00 [-16500, 6.00]	-6.00 [-16500, 6.00]
Missing	3026 (100%)	367 (75.8%)	3393 (96.7%)
GENE			
Ehlers-Danlos	1 (0.0%)	2 (0.4%)	3 (0.1%)
Loeys-Dietz	1 (0.0%)	0 (0%)	1 (0.0%)
Marfans	11 (0.4%)	3 (0.6%)	14 (0.4%)
Non-specific	84 (2.8%)	8 (1.7%)	92 (2.6%)
None	2929 (96.8%)	471 (97.3%)	3400 (96.9%)
PROXZONE_DISEASE			
Mean (SD)	6.60 (1.82)	4.91 (2.18)	6.36 (1.96)
Median [Min, Max]	7.00 [2.00, 9.00]	5.00 [2.00, 9.00]	7.00 [2.00, 9.00]
DISTZONE_DISEASE			
10B	600 (19.8%)	63 (13.0%)	663 (18.9%)
10L	131 (4.3%)	26 (5.4%)	157 (4.5%)
10R	182 (6.0%)	31 (6.4%)	213 (6.1%)
11B	56 (1.9%)	12 (2.5%)	68 (1.9%)
11L	31 (1.0%)	8 (1.7%)	39 (1.1%)
11R	36 (1.2%)	10 (2.1%)	46 (1.3%)
3	10 (0.3%)	3 (0.6%)	13 (0.4%)
4	37 (1.2%)	14 (2.9%)	51 (1.5%)
5	51 (1.7%)	38 (7.9%)	89 (2.5%)
6	21 (0.7%)	10 (2.1%)	31 (0.9%)
7	15 (0.5%)	23 (4.8%)	38 (1.1%)
8	145 (4.8%)	32 (6.6%)	177 (5.0%)
9	1711 (56.5%)	214 (44.2%)	1925 (54.8%)
extent			
Type 1 TAAA	84 (2.8%)	54 (11.2%)	138 (3.9%)
Type 2 TAAA	165 (5.5%)	103 (21.3%)	268 (7.6%)
Type 3 TAAA	477 (15.8%)	95 (19.6%)	572 (16.3%)
Type 4 TAAA	801 (26.5%)	92 (19.0%)	893 (25.4%)
Type 5 TAAA	114 (3.8%)	25 (5.2%)	139 (4.0%)
Missing	1385 (45.8%)	115 (23.8%)	1500 (42.7%)
ANESTHESIA			
General	2991 (98.8%)	474 (97.9%)	3465 (98.7%)
Local	21 (0.7%)	8 (1.7%)	29 (0.8%)
Regional	14 (0.5%)	2 (0.4%)	16 (0.5%)
CONTRAST			
Mean (SD)	123 (70.8)	119 (74.0)	122 (71.3)

	Asymptomatic	Symptomatic	Overall
Median [Min, Max]	110 [0, 677]	100 [0, 501]	110 [0, 677]
Missing	56 (1.9%)	11 (2.3%)	67 (1.9%)
EBL			
Mean (SD)	435 (719)	375 (446)	427 (688)
Median [Min, Max]	250 [0, 25000]	200 [0, 3000]	250 [0, 25000]
Missing	32 (1.1%)	8 (1.7%)	40 (1.1%)
FLUOROTIME			
Mean (SD)	72.1 (39.2)	59.7 (43.7)	70.3 (40.1)
Median [Min, Max]	64.4 [1.00, 320]	52.3 [4.00, 285]	63.1 [1.00, 320]
Missing	147 (4.9%)	15 (3.1%)	162 (4.6%)
INTRAOP_PRBC			
Mean (SD)	0.665 (4.11)	0.983 (1.95)	0.709 (3.89)
Median [Min, Max]	0 [0, 200]	0 [0, 15.0]	0 [0, 200]
Missing	2 (0.1%)	2 (0.4%)	4 (0.1%)
TOTALPROCTIME			
Mean (SD)	252 (113)	247 (135)	252 (116)
Median [Min, Max]	230 [25.0, 911]	213 [41.0, 852]	228 [25.0, 911]
Missing	2 (0.1%)	1 (0.2%)	3 (0.1%)
IVUSTEE			
Both	27 (0.9%)	15 (3.1%)	42 (1.2%)
IVUS	512 (16.9%)	190 (39.3%)	702 (20.0%)
No	2445 (80.8%)	270 (55.8%)	2715 (77.4%)
TEE	32 (1.1%)	8 (1.7%)	40 (1.1%)
Missing	10 (0.3%)	1 (0.2%)	11 (0.3%)
ACCESS			
Open	1086 (35.9%)	170 (35.1%)	1256 (35.8%)
Percutaneous	1620 (53.5%)	226 (46.7%)	1846 (52.6%)
Missing	320 (10.6%)	88 (18.2%)	408 (11.6%)
ARMNECK_ACCESS			
For both	243 (8.0%)	73 (15.1%)	316 (9.0%)
For branch treatment	514 (17.0%)	140 (28.9%)	654 (18.6%)
For femoral-brachial wire	114 (3.8%)	30 (6.2%)	144 (4.1%)
No	2155 (71.2%)	241 (49.8%)	2396 (68.3%)
AORDEV_NUM			
Mean (SD)	2.25 (0.918)	2.41 (1.20)	2.27 (0.964)
Median [Min, Max]	2.00 [1.00, 6.00]	2.00 [1.00, 6.00]	2.00 [1.00, 6.00]
AORDEV_CMOD			
No	791 (26.1%)	171 (35.3%)	962 (27.4%)
Yes	2235 (73.9%)	313 (64.7%)	2548 (72.6%)
DEV_GTYPE			
Custom	1581 (52.2%)	97 (20.0%)	1678 (47.8%)
Physician modified	577 (19.1%)	188 (38.8%)	765 (21.8%)
Standard	868 (28.7%)	199 (41.1%)	1067 (30.4%)
ILIACDEV_END_R			
Common	1555 (51.4%)	133 (27.5%)	1688 (48.1%)
External, Unintended	18 (0.6%)	3 (0.6%)	21 (0.6%)
External,Intended	200 (6.6%)	28 (5.8%)	228 (6.5%)
None	24 (0.8%)	1 (0.2%)	25 (0.7%)
Missing	1229 (40.6%)	319 (65.9%)	1548 (44.1%)
ILIACDEV_END_L			
Common	1595 (52.7%)	130 (26.9%)	1725 (49.1%)
External, Unintended	9 (0.3%)	2 (0.4%)	11 (0.3%)

	Asymptomatic	Symptomatic	Overall
External,Intended	157 (5.2%)	20 (4.1%)	177 (5.0%)
None	21 (0.7%)	1 (0.2%)	22 (0.6%)
Missing	1244 (41.1%)	331 (68.4%)	1575 (44.9%)
BRANCH_STAGED			
No	2854 (94.3%)	442 (91.3%)	3296 (93.9%)
Yes	167 (5.5%)	42 (8.7%)	209 (6.0%)
Missing	5 (0.2%)	0 (0%)	5 (0.1%)
BRANCH_LSUB			
No	2851 (94.2%)	354 (73.1%)	3205 (91.3%)
Yes	175 (5.8%)	130 (26.9%)	305 (8.7%)
BRANCH_CELIAC			
No	1399 (46.2%)	125 (25.8%)	1524 (43.4%)
Yes	1627 (53.8%)	359 (74.2%)	1986 (56.6%)
BRANCH_SMA			
No	487 (16.1%)	83 (17.1%)	570 (16.2%)
Yes	2539 (83.9%)	401 (82.9%)	2940 (83.8%)
BRANCH_RRENAL			
No	105 (3.5%)	80 (16.5%)	185 (5.3%)
Yes	2921 (96.5%)	404 (83.5%)	3325 (94.7%)
BRANCH_LRENAL			
No	105 (3.5%)	80 (16.5%)	185 (5.3%)
Yes	2921 (96.5%)	404 (83.5%)	3325 (94.7%)
ANESTHESIA_GEN_TIMEEXT			
<12 hrs	175 (5.8%)	33 (6.8%)	208 (5.9%)
>24 hrs	67 (2.2%)	41 (8.5%)	108 (3.1%)
12-24 hrs	101 (3.3%)	24 (5.0%)	125 (3.6%)
In OR	2641 (87.3%)	374 (77.3%)	3015 (85.9%)
Missing	42 (1.4%)	12 (2.5%)	54 (1.5%)
POSTOP_SPINALDRAIN			
None	2403 (79.4%)	290 (59.9%)	2693 (76.7%)
Post-op for spinal ischemia	19 (0.6%)	5 (1.0%)	24 (0.7%)
Post-op, prophylactic	13 (0.4%)	6 (1.2%)	19 (0.5%)
Pre-op	591 (19.5%)	183 (37.8%)	774 (22.1%)
R_CELIAC			
Fen/scallop Only	7 (0.2%)	0 (0%)	7 (0.2%)
Fenestrated Stentgraft Branch (Branched TEVAR)	12 (0.4%)	2 (0.4%)	14 (0.4%)
Patent, no intervention	43 (1.4%)	2 (0.4%)	45 (1.3%)
Stented-fen	3 (0.1%)	0 (0%)	3 (0.1%)
Chimney	0 (0%)	1 (0.2%)	1 (0.0%)
Missing	2961 (97.9%)	479 (99.0%)	3440 (98.0%)
R_DISTATTZONE			
Mean (SD)	7.92 (3.99)	6.80 (1.64)	7.82 (3.84)
Median [Min, Max]	10.0 [1.00, 11.0]	8.00 [5.00, 8.00]	10.0 [1.00, 11.0]
Missing	2975 (98.3%)	479 (99.0%)	3454 (98.4%)
R_GDPROXIMAL			
Mean (SD)	30.8 (4.27)	30.4 (4.93)	30.8 (4.28)
Median [Min, Max]	30.0 [20.0, 45.0]	31.0 [26.0, 38.0]	30.0 [20.0, 45.0]
Missing	2961 (97.9%)	479 (99.0%)	3440 (98.0%)
R_GRFTCONFIG			
Branched/fenestrated	65 (2.1%)	3 (0.6%)	68 (1.9%)
Standard	0 (0%)	2 (0.4%)	2 (0.1%)

	Asymptomatic	Symptomatic	Overall
Missing	2961 (97.9%)	479 (99.0%)	3440 (98.0%)
R_LT_RENAL			
Fenestrated Stentgraft Branch (Branched TEVAR)	15 (0.5%)	2 (0.4%)	17 (0.5%)
Patent, no intervention	1 (0.0%)	2 (0.4%)	3 (0.1%)
Purposely Occluded	4 (0.1%)	0 (0%)	4 (0.1%)
Stented-fen	45 (1.5%)	1 (0.2%)	46 (1.3%)
Missing	2961 (97.9%)	479 (99.0%)	3440 (98.0%)
R_PRATTZONE			
Mean (SD)	4.98 (2.79)	4.60 (1.52)	4.95 (2.70)
Median [Min, Max]	6.00 [1.00, 8.00]	5.00 [3.00, 6.00]	6.00 [1.00, 8.00]
Missing	2972 (98.2%)	479 (99.0%)	3451 (98.3%)
R_RT_RENAL			
Chronically Occluded	5 (0.2%)	0 (0%)	5 (0.1%)
Fenestrated Stentgraft Branch (Branched TEVAR)	15 (0.5%)	2 (0.4%)	17 (0.5%)
Patent, no intervention	1 (0.0%)	2 (0.4%)	3 (0.1%)
Stented-fen	44 (1.5%)	1 (0.2%)	45 (1.3%)
Missing	2961 (97.9%)	479 (99.0%)	3440 (98.0%)
R_SMA			
Fen/scallop Only	33 (1.1%)	0 (0%)	33 (0.9%)
Fenestrated Stentgraft Branch (Branched TEVAR)	12 (0.4%)	2 (0.4%)	14 (0.4%)
Patent, no intervention	8 (0.3%)	2 (0.4%)	10 (0.3%)
Stented-fen	12 (0.4%)	0 (0%)	12 (0.3%)
Chimney	0 (0%)	1 (0.2%)	1 (0.0%)
Missing	2961 (97.9%)	479 (99.0%)	3440 (98.0%)
lrenal			
Chimney	35 (1.2%)	10 (2.1%)	45 (1.3%)
None	323 (10.7%)	78 (16.1%)	401 (11.4%)
Occluded/Covered	76 (2.5%)	25 (5.2%)	101 (2.9%)
Scallop/Fen/Branch	2480 (82.0%)	290 (59.9%)	2770 (78.9%)
Missing	112 (3.7%)	81 (16.7%)	193 (5.5%)
rrenal			
Chimney	32 (1.1%)	9 (1.9%)	41 (1.2%)
None	357 (11.8%)	96 (19.8%)	453 (12.9%)
Occluded/Covered	72 (2.4%)	22 (4.5%)	94 (2.7%)
Scallop/Fen/Branch	2374 (78.5%)	265 (54.8%)	2639 (75.2%)
Missing	191 (6.3%)	92 (19.0%)	283 (8.1%)
sma			
Chimney	18 (0.6%)	6 (1.2%)	24 (0.7%)
None	267 (8.8%)	76 (15.7%)	343 (9.8%)
Occluded/Covered	3 (0.1%)	0 (0%)	3 (0.1%)
Scallop/Fen/Branch	2243 (74.1%)	319 (65.9%)	2562 (73.0%)
Missing	495 (16.4%)	83 (17.1%)	578 (16.5%)
celiac			
Chimney	9 (0.3%)	3 (0.6%)	12 (0.3%)
None	381 (12.6%)	94 (19.4%)	475 (13.5%)
Occluded/Covered	69 (2.3%)	28 (5.8%)	97 (2.8%)
Scallop/Fen/Branch	1163 (38.4%)	234 (48.3%)	1397 (39.8%)
Missing	1404 (46.4%)	125 (25.8%)	1529 (43.6%)
lsub			

	Asymptomatic	Symptomatic	Overall
Chimney	6 (0.2%)	0 (0%)	6 (0.2%)
None	15 (0.5%)	10 (2.1%)	25 (0.7%)
Occluded/Covered	3 (0.1%)	10 (2.1%)	13 (0.4%)
Scallop/Fen/Branch	125 (4.1%)	99 (20.5%)	224 (6.4%)
Missing	2877 (95.1%)	365 (75.4%)	3242 (92.4%)

##	lrenal	rrenal	sma	celiac
## 1	Scallop/Fen/Branch	Scallop/Fen/Branch	Chimney	<NA>
## 2	Scallop/Fen/Branch	Scallop/Fen/Branch	Scallop/Fen/Branch	Chimney
## 3	Scallop/Fen/Branch	Scallop/Fen/Branch	Chimney	Chimney
## 4	Chimney	Chimney	Scallop/Fen/Branch	<NA>
## 5	Chimney	Chimney	Scallop/Fen/Branch	<NA>
## 6	<NA>	<NA>	Chimney	Scallop/Fen/Branch
## 7	Chimney	None	Scallop/Fen/Branch	None
## 8	Chimney	Chimney	Scallop/Fen/Branch	Chimney
## 9	Chimney	Chimney	Scallop/Fen/Branch	<NA>
## 10	Scallop/Fen/Branch	Scallop/Fen/Branch	Chimney	Chimney
## 11	Chimney	Chimney	Scallop/Fen/Branch	<NA>
## 12	Chimney	Chimney	Scallop/Fen/Branch	<NA>
## 13	Chimney	None	Scallop/Fen/Branch	Scallop/Fen/Branch
## 14	Scallop/Fen/Branch	Scallop/Fen/Branch	Scallop/Fen/Branch	Scallop/Fen/Branch
## 15	Scallop/Fen/Branch	Scallop/Fen/Branch	Scallop/Fen/Branch	Scallop/Fen/Branch
## 16	Chimney	Chimney	Scallop/Fen/Branch	<NA>
## 17	Chimney	Chimney	Scallop/Fen/Branch	Occluded/Covered
## 18	Chimney	Chimney	Scallop/Fen/Branch	<NA>
## 19	Chimney	Chimney	Scallop/Fen/Branch	<NA>
## 20	Chimney	Chimney	Scallop/Fen/Branch	None
## 21	Scallop/Fen/Branch	Scallop/Fen/Branch	Chimney	Scallop/Fen/Branch
## 22	Chimney	Chimney	Scallop/Fen/Branch	None
## 23	Chimney	Chimney	Scallop/Fen/Branch	Occluded/Covered
## 24	Chimney	Chimney	Scallop/Fen/Branch	Chimney
## 25	Chimney	Chimney	Scallop/Fen/Branch	Occluded/Covered
## 26	Scallop/Fen/Branch	Scallop/Fen/Branch	Scallop/Fen/Branch	Chimney
## 27	Scallop/Fen/Branch	Scallop/Fen/Branch	Chimney	<NA>
## 28	Chimney	Chimney	Chimney	Scallop/Fen/Branch
## 29	Scallop/Fen/Branch	Scallop/Fen/Branch	Chimney	<NA>
## 30	Chimney	Chimney	Scallop/Fen/Branch	Occluded/Covered
## 31	None	<NA>	Scallop/Fen/Branch	Chimney
## 32	None	<NA>	Scallop/Fen/Branch	Chimney
## 33	Chimney	Chimney	Scallop/Fen/Branch	Scallop/Fen/Branch
## 34	Chimney	Chimney	Scallop/Fen/Branch	Scallop/Fen/Branch
## 35	Chimney	Chimney	Scallop/Fen/Branch	Scallop/Fen/Branch
## 36	Chimney	Chimney	Scallop/Fen/Branch	Scallop/Fen/Branch
## 37	Chimney	Chimney	Chimney	Scallop/Fen/Branch
## 38	Chimney	Chimney	Scallop/Fen/Branch	Scallop/Fen/Branch
## 39	Chimney	Chimney	Chimney	Scallop/Fen/Branch
## 40	Chimney	Chimney	Scallop/Fen/Branch	Occluded/Covered
## 41	Scallop/Fen/Branch	None	Chimney	<NA>
## 42	Chimney	Chimney	Scallop/Fen/Branch	<NA>
## 43	Scallop/Fen/Branch	Scallop/Fen/Branch	Scallop/Fen/Branch	Chimney
## 44	Chimney	Chimney	Scallop/Fen/Branch	None
## 45	Scallop/Fen/Branch	Scallop/Fen/Branch	Chimney	<NA>


```

## 46          Chimney          None Scallop/Fen/Branch      <NA>
## 47 Scallop/Fen/Branch Scallop/Fen/Branch Scallop/Fen/Branch Scallop/Fen/Branch
## 48          Chimney          Chimney Scallop/Fen/Branch      <NA>
## 49          Chimney          Chimney Scallop/Fen/Branch      <NA>
## 50          Chimney          None Scallop/Fen/Branch      <NA>
## 51 Scallop/Fen/Branch Scallop/Fen/Branch Scallop/Fen/Branch Scallop/Fen/Branch
## 52 Scallop/Fen/Branch Scallop/Fen/Branch Scallop/Fen/Branch Scallop/Fen/Branch
## 53          Chimney          Chimney Scallop/Fen/Branch      None
## 54          Chimney          Chimney Scallop/Fen/Branch      None
## 55          Chimney          Chimney          Chimney Scallop/Fen/Branch
## 56          Chimney          Chimney Scallop/Fen/Branch      None
## 57          Chimney          Chimney Scallop/Fen/Branch Scallop/Fen/Branch
## 58          Chimney          Chimney Scallop/Fen/Branch Scallop/Fen/Branch
## 59 Scallop/Fen/Branch Scallop/Fen/Branch          Chimney      Chimney
## 60 Scallop/Fen/Branch Scallop/Fen/Branch          Chimney Scallop/Fen/Branch
## 61          Chimney          Chimney Scallop/Fen/Branch Scallop/Fen/Branch
## 62 Scallop/Fen/Branch Scallop/Fen/Branch          Chimney      Chimney
## 63 Scallop/Fen/Branch Scallop/Fen/Branch          Chimney      <NA>
## 64 Scallop/Fen/Branch Scallop/Fen/Branch          Chimney      Occluded/Covered
## 65 Scallop/Fen/Branch Scallop/Fen/Branch          Chimney      Chimney
## 66          Chimney          Chimney          Chimney Scallop/Fen/Branch
## 67 Scallop/Fen/Branch Scallop/Fen/Branch          Chimney      <NA>
## 68          Chimney          Chimney Scallop/Fen/Branch Scallop/Fen/Branch
## 69 Scallop/Fen/Branch Scallop/Fen/Branch Scallop/Fen/Branch Scallop/Fen/Branch
## 70 Scallop/Fen/Branch Scallop/Fen/Branch          Chimney      Occluded/Covered
## 71          Chimney          Chimney Scallop/Fen/Branch Scallop/Fen/Branch
## 72          Chimney          Chimney Scallop/Fen/Branch      <NA>
## 73 Scallop/Fen/Branch Scallop/Fen/Branch          Chimney Scallop/Fen/Branch
## 74          Chimney          Chimney          None Scallop/Fen/Branch
## 75 Scallop/Fen/Branch Scallop/Fen/Branch          Chimney      <NA>

```

The levels of `lrenal`, `rrenal`, `sma`, `celiac`, `lsub` are really messy.

75 patients have at least one ‘Chimney’.

206 patients have at least one ‘Occluded/Covered’.

3510 patients have at least one ‘Scallop/Fen/Branch’.

0 patients have all ‘None’.

Outcomes

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

	Asymptomatic	Symptomatic	Overall
	(N=3026)	(N=484)	(N=3510)
DEAD			
No	2651 (87.6%)	389 (80.4%)	3040 (86.6%)
Yes	375 (12.4%)	95 (19.6%)	470 (13.4%)
PROC_SURVIVALDAYS			
Mean (SD)	787 (769)	673 (747)	771 (767)
Median [Min, Max]	484 [0, 3390]	400 [0, 3290]	476 [0, 3390]

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

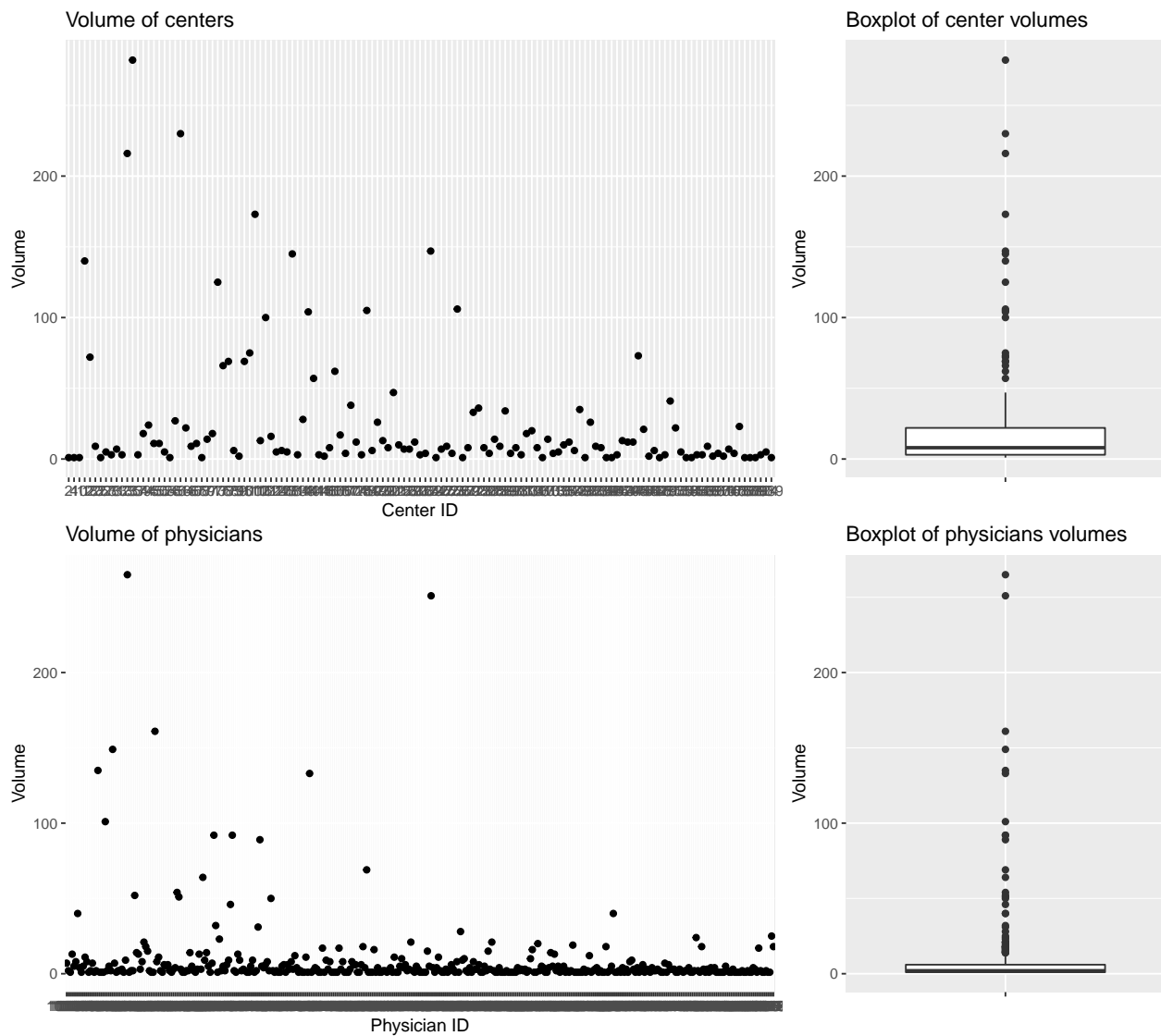
	Asymptomatic	Symptomatic	Overall
	(N=3026)	(N=484)	(N=3510)
TOTAL_LOS			
Mean (SD)	6.40 (21.2)	12.9 (28.0)	7.29 (22.4)
Median [Min, Max]	3.00 [0, 372]	8.00 [1.00, 376]	4.00 [0, 376]
POSTOP_LOS			
Mean (SD)	5.62 (18.6)	8.04 (8.52)	5.96 (17.6)
Median [Min, Max]	3.00 [0, 372]	5.00 [0, 80.0]	3.00 [0, 372]
AORDEV_TECHSUCC			
No	78 (2.6%)	17 (3.5%)	95 (2.7%)
Yes	2669 (88.2%)	403 (83.3%)	3072 (87.5%)
Missing	279 (9.2%)	64 (13.2%)	343 (9.8%)
CONVTOOPEN			
No	3016 (99.7%)	483 (99.8%)	3499 (99.7%)
Yes	10 (0.3%)	1 (0.2%)	11 (0.3%)
R_ENDOLEAK_AT_COMPLETION			
No	54 (1.8%)	4 (0.8%)	58 (1.7%)
Yes	11 (0.4%)	1 (0.2%)	12 (0.3%)
Missing	2961 (97.9%)	479 (99.0%)	3440 (98.0%)
BRANCH_POST			
No	2611 (86.3%)	364 (75.2%)	2975 (84.8%)
Yes	412 (13.6%)	119 (24.6%)	531 (15.1%)
Missing	3 (0.1%)	1 (0.2%)	4 (0.1%)
ICUSTAY			
Mean (SD)	2.12 (4.35)	4.77 (6.28)	2.49 (4.75)
Median [Min, Max]	1.00 [0, 85.0]	3.00 [0, 49.0]	1.00 [0, 85.0]
Missing	3 (0.1%)	1 (0.2%)	4 (0.1%)
POSTOP_PRBC			
Mean (SD)	1.22 (4.07)	1.91 (3.85)	1.31 (4.05)
Median [Min, Max]	0 [0, 77.0]	0 [0, 38.0]	0 [0, 77.0]
Missing	2 (0.1%)	0 (0%)	2 (0.1%)
POSTOP_VASO			
No	2493 (82.4%)	333 (68.8%)	2826 (80.5%)
Yes	531 (17.5%)	151 (31.2%)	682 (19.4%)
Missing	2 (0.1%)	0 (0%)	2 (0.1%)
POSTOP_HIGHCREAT			
Mean (SD)	1.45 (1.10)	1.88 (1.88)	1.51 (1.24)
Median [Min, Max]	1.19 [0.0100, 15.4]	1.20 [0.450, 11.8]	1.20 [0.0100, 15.4]
Missing	16 (0.5%)	4 (0.8%)	20 (0.6%)
POSTOP_COMPLICATIONS			
No	2410 (79.6%)	345 (71.3%)	2755 (78.5%)
Yes	615 (20.3%)	139 (28.7%)	754 (21.5%)
Missing	1 (0.0%)	0 (0%)	1 (0.0%)
R_POSTOP_HEMATOMA			
No	1988 (65.7%)	342 (70.7%)	2330 (66.4%)
Yes	74 (2.4%)	10 (2.1%)	84 (2.4%)
Missing	964 (31.9%)	132 (27.3%)	1096 (31.2%)
R_POSTOP_SITEOCC			
No	2463 (81.4%)	386 (79.8%)	2849 (81.2%)
Yes	20 (0.7%)	1 (0.2%)	21 (0.6%)
Missing	543 (17.9%)	97 (20.0%)	640 (18.2%)

	Asymptomatic	Symptomatic	Overall
POSTOP_AH			
No	2725 (90.1%)	436 (90.1%)	3161 (90.1%)
Yes	301 (9.9%)	48 (9.9%)	349 (9.9%)
POSTOP_CEREBROSEX			
Mean (SD)	0.0731 (0.642)	0.153 (0.933)	0.0841 (0.690)
Median [Min, Max]	0 [0, 7.00]	0 [0, 7.00]	0 [0, 7.00]
Missing	1 (0.0%)	0 (0%)	1 (0.0%)
POSTOP_RESPIRATORY			
No	2901 (95.9%)	440 (90.9%)	3341 (95.2%)
Yes	125 (4.1%)	44 (9.1%)	169 (4.8%)
POSTOP_DIALYSIS			
No	2937 (97.1%)	438 (90.5%)	3375 (96.2%)
Yes	50 (1.7%)	24 (5.0%)	74 (2.1%)
Missing	39 (1.3%)	22 (4.5%)	61 (1.7%)
POSTOP_ARMEMBO			
No	3013 (99.6%)	480 (99.2%)	3493 (99.5%)
Yes	13 (0.4%)	4 (0.8%)	17 (0.5%)
POSTOP_LEGEMBO			
No	2962 (97.9%)	464 (95.9%)	3426 (97.6%)
Yes	64 (2.1%)	20 (4.1%)	84 (2.4%)
POSTOP_LEGCOMPART			
No	2999 (99.1%)	480 (99.2%)	3479 (99.1%)
Yes	27 (0.9%)	4 (0.8%)	31 (0.9%)
POSTOP_INTISCH			
Mean (SD)	0.0357 (0.327)	0.0599 (0.444)	0.0390 (0.346)
Median [Min, Max]	0 [0, 4.00]	0 [0, 4.00]	0 [0, 4.00]
R_POSTOP_BOWELISCH			
No	61 (2.0%)	4 (0.8%)	65 (1.9%)
Yes	5 (0.2%)	1 (0.2%)	6 (0.2%)
Missing	2960 (97.8%)	479 (99.0%)	3439 (98.0%)
POSTOP_RENALISCH			
No	2937 (97.1%)	467 (96.5%)	3404 (97.0%)
Yes	89 (2.9%)	17 (3.5%)	106 (3.0%)
R_POSTOP_SSI			
No	2479 (81.9%)	384 (79.3%)	2863 (81.6%)
Yes	4 (0.1%)	3 (0.6%)	7 (0.2%)
Missing	543 (17.9%)	97 (20.0%)	640 (18.2%)
POSTOP_SPINAL_ISCHEMIA			
No	2940 (97.2%)	453 (93.6%)	3393 (96.7%)
Yes	86 (2.8%)	31 (6.4%)	117 (3.3%)
RETX_R_RTOR			
No	2844 (94.0%)	434 (89.7%)	3278 (93.4%)
Yes	181 (6.0%)	50 (10.3%)	231 (6.6%)
Missing	1 (0.0%)	0 (0%)	1 (0.0%)
DC_STATUS			
Dead	69 (2.3%)	22 (4.5%)	91 (2.6%)
Home	2566 (84.8%)	350 (72.3%)	2916 (83.1%)
Homeless	1 (0.0%)	1 (0.2%)	2 (0.1%)
Nursing Home	107 (3.5%)	38 (7.9%)	145 (4.1%)
Other Hospital	24 (0.8%)	17 (3.5%)	41 (1.2%)
Rehab Unit	259 (8.6%)	56 (11.6%)	315 (9.0%)
R_LE_ISCH			

	Asymptomatic	Symptomatic	Overall
No	7 (0.2%)	0 (0%)	7 (0.2%)
Missing	3019 (99.8%)	484 (100%)	3503 (99.8%)
R_POSTOP_RENAL			
No	58 (1.9%)	4 (0.8%)	62 (1.8%)
Yes	8 (0.3%)	1 (0.2%)	9 (0.3%)
Missing	2960 (97.8%)	479 (99.0%)	3439 (98.0%)

Volume Variables

Volume Variables: REGIONID, CENTERID, PHYSICIANID



19 regions, 133 centers, 385 physicians.

Quantiles of centers' volume: 1, 3, 8, 22, 282

Quantiles of physicians' volume: 1, 1, 2, 6, 265

Code Appendix

```
knitr::opts_chunk$set(echo = FALSE,message = FALSE,warning = FALSE,fig.width = 10)
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/jennifercci/Desktop/Comparative-analysis-of-treatments-of-CAA'
#path_jenn = c(
#  "/Users/jennifercci/Desktop/Comparative-analysis-of-treatments-of-CAA/TEVAR_International_20210712/TE
#  "/Users/jennifercci/Desktop/Comparative-analysis-of-treatments-of-CAA/TEVAR_International_20210712/TE
#  "/Users/jennifercci/Desktop/Comparative-analysis-of-treatments-of-CAA/TEVAR_International_20210901/TE
#  "/Users/jennifercci/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(~ 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+PREOP_CREAT
  | PRESENTATION, data = FBVAR,overall="Total")
## ----- table: Operative Variables-----
table1(~ PRIOR_AORSURG+
  PATHOLOGY+PREOP_MAXAAADIA+URGENCY+
  PATHOLOGY_ANEURYSM_TYPE+PATHOLOGY_DISSECT_TYPE+PATHOLOGY_DISSECT_ONSET_DAYS+
  GENE+PROXZONE_DISEASE+DISTZONE_DISEASE+ extent+
  ANESTHESIA+CONTRAST+EBL+FLUOROTIME+INTRAOP_PRBC+TOTALPROCTIME+IVUSTEE+
  ACCESS+ #ACCESS_R+ACCESS_L+
  #LRGST_SHEATH_SIZE_R+LRGST_SHEATH_SIZE_L+
  ARMNECK_ACCESS+ #ARMNECK_ACCESS_LOC+
  AORDEV_NUM+AORDEV_CMOD+# STAGEDAORTRT+
  DEV_GTYPE+ # DEV1_GTYPE+DEV2_GTYPE+DEV3_GTYPE+
  ILIACDEV_END_R+ILIACDEV_END_L+
  BRANCH_STAGED+BRANCH_LSUB+BRANCH_CELIAC+BRANCH_SMA+BRANCH_RRENAL+BRANCH_LRENAL+
  ANESTHESIA_GEN_TIMEEXT+POSTOP_SPINALDRAIN+
  R_CELIAC+R_DISTATTZONE+R_GDPROXIMAL+R_GRFTCONFIG+
```

```

R_LT_RENAL+R_PRATTZONE+R_RT_RENAL+R_SMA+
lrenal+rrenal+sma+celiac+lsub
| PRESENTATION, data = FBVAR)

FBVAR %>% filter(lrenal=='Chimney'|rrenal=='Chimney'|sma=='Chimney'|celiac=='Chimney'|lsub=='Chimney')

## ----- 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_RENAL_POST+
#BRANCH_LRENAL_POST+BRANCH_RCOMILI_POST+BRANCH_LCOMILI_POST+
BRANCH_POST+ICUSTAY+
POSTOP_PRBC+POSTOP_VASO+POSTOP_HIGHCREAT+POSTOP_COMPLICATIONS+
R_POSTOP_HEMATOMA+R_POSTOP_SITEOCC+
POSTOP_AH+#POSTOP_MI+POSTOP_DYSRHYTHMIA+POSTOP_CHF+
POSTOP_CEREBROX+POSTOP_RESPIRATORY+
POSTOP_DIALYSIS+POSTOP_ARMEMBO+POSTOP_LEGEMBO+POSTOP_LEGCOMPART+POSTOP_INTISCH+
R_POSTOP_BOWELISCH+POSTOP_RENALISCH+R_POSTOP_SSI+POSTOP_SPINAL_ISCHEMIA+
RETX_R_RTOR+#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"))
```