Univariate Analysis for the VQI FBVAR Dataset

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p-value

We use Welch's Two Sample t-test for continuous variables and Pearson's Chi-squared Test for categorical variables.

Descriptive statistics tables

population of interest

	Overall
	(N=2690)
PRESENTATION	
Asymptomatic	2376 (88.3%)
Symptomatic	314 (11.7%)

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	Symptomatic	P-value
	(N=2376)	(N=314)	
AGE			
Mean (SD)	73.4 (7.97)	70.2 (10.3)	<0.001
Median [Min, Max]	74.0 [0, 90.0]	71.0 [33.0, 90.0]	
AGECAT			
<50	14 (0.6%)	13 (4.1%)	<0.001
>79	523 (22.0%)	54 (17.2%)	
50-59	85 (3.6%)	33 (10.5%)	
60-69	612 (25.8%)	85 (27.1%)	
70-79	1142 (48.1%)	129 (41.1%)	
GENDER			
female	562 (23.7%)	127 (40.4%)	<0.001
male	1814 (76.3%)	187 (59.6%)	
ETHNICITY			
Hispanic or Latino	81 (3.4%)	13 (4.1%)	0.621
None Hispanic or Latino	2291 (96.4%)	301 (95.9%)	
Missing	4 (0.2%)	0 (0%)	
RACE			
American Indian or Alaskan Native	5 (0.2%)	1 (0.3%)	<0.001
Asian	42 (1.8%)	6 (1.9%)	
Black or African American	152 (6.4%)	48 (15.3%)	
More than 1 race	3 (0.1%)	1 (0.3%)	

	Asymptomatic	Symptomatic	P-value
Native Hawaiian or other Pacific Islander	1 (0.0%)	1 (0.3%)	
Unknown/Other	133 (5.6%)	26 (8.3%)	
White	2040 (85.9%)	231 (73.6%)	
TRANSFER			
Hospital	32 (1.3%)	137 (43.6%)	<0.001
No	2342 (98.6%)	176 (56.1%)	
Rehab Unit	2 (0.1%)	1 (0.3%)	
PRIMARYINSURER			
Commercial	666 (28.0%)	94 (29.9%)	<0.001
Medicaid	46 (1.9%)	24 (7.6%)	
Medicare	1314 (55.3%)	155 (49.4%)	
Military/VA	87 (3.7%)	9 (2.9%)	
Non US Insurance	129 (5.4%)	6 (1.9%)	
Self Pay	11 (0.5%)	10 (3.2%)	
Missing	123 (5.2%)	16 (5.1%)	
LIVINGSTATUS			
Home	2357 (99.2%)	307 (97.8%)	0.048
Homeless	2 (0.1%)	1 (0.3%)	
Nursing home	17 (0.7%)	6 (1.9%)	
PREOP_FUNCSTATUS			
Assisted care	40 (1.7%)	15 (4.8%)	0.001
Bed bound	3 (0.1%)	1 (0.3%)	
Full	1536 (64.6%)	179 (57.0%)	
Light work	544 (22.9%)	77 (24.5%)	
Self care	252 (10.6%)	41 (13.1%)	
Missing	1 (0.0%)	1 (0.3%)	
PRIOR_CVD			
No	2131 (89.7%)	270 (86.0%)	0.058
Yes	245 (10.3%)	44 (14.0%)	
PRIOR_CAD			
No	1698 (71.5%)	214 (68.2%)	0.25
Yes	678 (28.5%)	100 (31.8%)	
PRIOR_CHF			
No	2050 (86.3%)	260 (82.8%)	0.115
Yes	326 (13.7%)	54 (17.2%)	
COPD			
No	1454 (61.2%)	172 (54.8%)	0.034
Yes	922 (38.8%)	142 (45.2%)	
DIABETES			
No	1945 (81.9%)	253 (80.6%)	0.634
Yes	431 (18.1%)	61 (19.4%)	
PREOP_DIALYSIS			
No	2336 (98.3%)	298 (94.9%)	<0.001
Yes	40 (1.7%)	16 (5.1%)	
HTN			
No	255 (10.7%)	27 (8.6%)	0.297
Yes	2114 (89.0%)	285 (90.8%)	
Missing	7 (0.3%)	2 (0.6%)	
PREOP_SMOKING			
No	265 (11.2%)	47 (15.0%)	0.059
Yes	2111 (88.8%)	267 (85.0%)	
PRIOR_CABG			

	Asymptomatic	Symptomatic	P-value
No	1958 (82.4%)	266 (84.7%)	0.357
Yes	417 (17.6%)	48 (15.3%)	
Missing	1 (0.0%)	0 (0%)	
PRIOR_PCI			
No	1826 (76.9%)	254 (80.9%)	0.131
Yes	548 (23.1%)	60 (19.1%)	
Missing	2 (0.1%)	0 (0%)	
PRIOR_ANEURREP			
No	1897 (79.8%)	224 (71.3%)	<0.001
Yes	479 (20.2%)	90 (28.7%)	
STRESS			
No	1212 (51.0%)	241 (76.8%)	<0.001
Yes	1162 (48.9%)	73 (23.2%)	
Missing	2 (0.1%)	0 (0%)	
PREOP_CREAT			
Mean (SD)	1.18 (0.675)	1.15 (0.665)	0.426
Median [Min, Max]	1.08 [0, 14.4]	1.00 [0.400, 7.50]	
Missing	54 (2.3%)	14 (4.5%)	
DC_ASA			
No	334 (14.1%)	37 (11.8%)	0.412
Yes	1976 (83.2%)	259 (82.5%)	
Missing	66 (2.8%)	18 (5.7%)	
DC_P2Y			
No	993 (41.8%)	156 (49.7%)	0.002
Yes	1316 (55.4%)	140 (44.6%)	
Missing	67 (2.8%)	18 (5.7%)	
DC_STATIN			
No	413 (17.4%)	48 (15.3%)	0.532
Yes	1897 (79.8%)	248 (79.0%)	
Missing	66 (2.8%)	18 (5.7%)	

Operative Variables

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

	Asymptomatic	Symptomatic	P-value
	(N=2376)	(N=314)	
PRIOR_AORSURG			
Both	59 (2.5%)	10 (3.2%)	<0.001
Endo	212 (8.9%)	54 (17.2%)	
None	1911 (80.4%)	216 (68.8%)	
Open	194 (8.2%)	34 (10.8%)	
PATHOLOGY			
Aneurysm	2286 (96.2%)	253 (80.6%)	<0.001
Aneurysm from dissection	56 (2.4%)	20 (6.4%)	
Dissection	18 (0.8%)	28 (8.9%)	
PAU/IMH	16 (0.7%)	13 (4.1%)	
PREOP_MAXAAADIA			
Mean (SD)	60.8 (10.3)	65.1 (17.1)	<0.001
Median [Min, Max]	59.0 [5.00, 130]	61.0 [5.50, 126]	
Missing	12 (0.5%)	5 (1.6%)	

	Asymptomatic	Symptomatic	P-value
URGENCY			
Elective	2352 (99.0%)	174 (55.4%)	<0.001
Emergent	2 (0.1%)	24 (7.6%)	
Urgent	22 (0.9%)	116 (36.9%)	
PATHOLOGY_ANEURYSM_TYPE			
Anastomotic	33 (1.4%)	6 (1.9%)	<0.001
Degenerative, fusiform	1980 (83.3%)	212 (67.5%)	
Degenerative, saccular	214 (9.0%)	27 (8.6%)	
Intercostal or visceral patch	12 (0.5%)	1 (0.3%)	
Prior trauma	0 (0%)	2 (0.6%)	
Missing	137 (5.8%)	66 (21.0%)	
PATHOLOGY_DISSECT_TYPE			
Acute, <= 30 days	5 (0.2%)	23 (7.3%)	<0.001
Chronic, >30 days	69 (2.9%)	25 (8.0%)	
Missing	2302 (96.9%)	266 (84.7%)	
PROXZONE_DISEASE			
Mean (SD)	6.85 (1.59)	5.63 (1.97)	<0.001
Median [Min, Max]	7.00 [2.00, 9.00]	6.00 [2.00, 9.00]	
GENHIST			
Ehlers-Danlos	1 (0.0%)	1 (0.3%)	0.202
Marfans	9 (0.4%)	2 (0.6%)	
Non-specific	64 (2.7%)	5 (1.6%)	
None	2302 (96.9%)	306 (97.5%)	
DISTZONE_DISEASE			
10B	510 (21.5%)	50 (15.9%)	<0.001
10L	101 (4.3%)	10 (3.2%)	
10R	145 (6.1%)	17 (5.4%)	
11B	41 (1.7%)	7 (2.2%)	
11L	21 (0.9%)	3 (1.0%)	
11R	27 (1.1%)	6 (1.9%)	
5	13 (0.5%)	2 (0.6%)	
6	16 (0.7%)	9 (2.9%)	
7	13 (0.5%)	16 (5.1%)	
8	115 (4.8%)	24 (7.6%)	
9	1374 (57.8%)	170 (54.1%)	
extent			
Juxtarenal AAA	1020 (42.9%)	70 (22.3%)	<0.001
Type 1 TAAA	5 (0.2%)	1 (0.3%)	
Type 2 TAAA	88 (3.7%)	46 (14.6%)	
Type 3 TAAA	363 (15.3%)	74 (23.6%)	
Type 4 TAAA	721 (30.3%)	87 (27.7%)	
Type 5 TAAA	34 (1.4%)	13 (4.1%)	
Missing	145 (6.1%)	23 (7.3%)	
ANESTHESIA			
General	2350 (98.9%)	306 (97.5%)	0.049
Local	15 (0.6%)	6 (1.9%)	
Regional	11 (0.5%)	2 (0.6%)	
CONTRAST			
Mean (SD)	125 (72.1)	122 (77.2)	0.581
Median [Min, Max]	110 [0, 677]	106 [0, 501]	
Missing	45 (1.9%)	8 (2.5%)	
EBL			

	Asymptomatic	Symptomatic	P-value
Mean (SD)	440 (763)	441 (471)	0.964
Median [Min, Max]	250 [0, 25000]	300 [0, 3000]	
Missing	24 (1.0%)	5 (1.6%)	
FLUOROTIME			
Mean (SD)	73.2 (38.8)	70.7 (45.0)	0.355
Median [Min, Max]	65.0 [1.00, 320]	63.8 [6.80, 285]	
Missing	111 (4.7%)	10 (3.2%)	
INTRAOP_PRBC			
Mean (SD)	0.673 (4.58)	1.14 (2.04)	0.002
Median [Min, Max]	0 [0, 200]	0 [0, 14.0]	
Missing	1 (0.0%)	2 (0.6%)	
TOTALPROCTIME			
Mean (SD)	254 (113)	271 (138)	0.028
Median [Min, Max]	230 [25.0, 911]	240 [52.0, 852]	
Missing	2 (0.1%)	1 (0.3%)	
IVUSTEE			
Both	16 (0.7%)	3 (1.0%)	<0.001
IVUS	368 (15.5%)	96 (30.6%)	
No	1962 (82.6%)	209 (66.6%)	
TEE	21 (0.9%)	6 (1.9%)	
Missing	9 (0.4%)	0 (0%)	
ACCESS			
Open	873 (36.7%)	122 (38.9%)	0.314
Percutaneous	1289 (54.3%)	157 (50.0%)	
Missing	214 (9.0%)	35 (11.1%)	
ARMNECK_ACCESS			
No	1786 (75.2%)	191 (60.8%)	<0.001
Yes	590 (24.8%)	123 (39.2%)	
AORDEV_NUM			
Mean (SD)	2.24 (0.876)	2.57 (1.25)	<0.001
Median [Min, Max]	2.00 [1.00, 6.00]	2.00 [1.00, 6.00]	
AORDEV_CMOD			
No	632 (26.6%)	83 (26.4%)	1
Yes	1744 (73.4%)	231 (73.6%)	
DEV_GTYPE			
Custom	1241 (52.2%)	75 (23.9%)	<0.001
Physician modified	443 (18.6%)	133 (42.4%)	
Standard	692 (29.1%)	106 (33.8%)	
ILIACDEV_END_R			
Common	1343 (56.5%)	114 (36.3%)	0.044
External, Unintended	16 (0.7%)	3 (1.0%)	
External,Intended	171 (7.2%)	26 (8.3%)	
None	20 (0.8%)	1 (0.3%)	
Missing	826 (34.8%)	170 (54.1%)	
ILIACDEV_END_L			
Common	1374 (57.8%)	113 (36.0%)	0.183
External, Unintended	9 (0.4%)	2 (0.6%)	
External,Intended	128 (5.4%)	17 (5.4%)	
None	19 (0.8%)	1 (0.3%)	
Missing	846 (35.6%)	181 (57.6%)	
BRANCH_STAGED			
No	2254 (94.9%)	287 (91.4%)	0.01

	Asymptomatic	Symptomatic	P-value
Yes	117 (4.9%)	27 (8.6%)	
Missing	5 (0.2%)	0 (0%)	
BRANCH_LSUB			
No	2336 (98.3%)	284 (90.4%)	<0.001
Yes	40 (1.7%)	30 (9.6%)	
BRANCH_CELIAC			
No	1129 (47.5%)	64 (20.4%)	<0.001
Yes	1247 (52.5%)	250 (79.6%)	
BRANCH_SMA			
No	342 (14.4%)	21 (6.7%)	<0.001
Yes	2034 (85.6%)	293 (93.3%)	
BRANCH_RRENAL			
No	18 (0.8%)	17 (5.4%)	<0.001
Yes	2358 (99.2%)	297 (94.6%)	
BRANCH_LRENAL			
No	18 (0.8%)	17 (5.4%)	<0.001
Yes	2358 (99.2%)	297 (94.6%)	
ANESTHESIA_GEN_TIMEEXT			
<12 hrs	128 (5.4%)	24 (7.6%)	<0.001
>24 hrs	58 (2.4%)	23 (7.3%)	
12-24 hrs	67 (2.8%)	15 (4.8%)	
In OR	2091 (88.0%)	243 (77.4%)	
Missing	32 (1.3%)	9 (2.9%)	
POSTOP_SPINALDRAIN			
No	1946 (81.9%)	206 (65.6%)	<0.001
Yes	430 (18.1%)	108 (34.4%)	
lrenal			
None	242 (10.2%)	33 (10.5%)	0.002
Occluded/Covered	63 (2.7%)	19 (6.1%)	
Scallop/Fen/Branch/Chimney	2046 (86.1%)	244 (77.7%)	
Missing	25 (1.1%)	18 (5.7%)	
rrenal			
None	265 (11.2%)	49 (15.6%)	<0.001
Occluded/Covered	59 (2.5%)	17 (5.4%)	
Scallop/Fen/Branch/Chimney	1961 (82.5%)	221 (70.4%)	
Missing	91 (3.8%)	27 (8.6%)	
sma			
None	189 (8.0%)	28 (8.9%)	0.799
Occluded/Covered	3 (0.1%)	0 (0%)	
Scallop/Fen/Branch/Chimney	1835 (77.2%)	265 (84.4%)	
Missing	349 (14.7%)	21 (6.7%)	
celiac			
None	296 (12.5%)	45 (14.3%)	0.006
Occluded/Covered	53 (2.2%)	21 (6.7%)	
Scallop/Fen/Branch/Chimney	893 (37.6%)	184 (58.6%)	
Missing	1134 (47.7%)	64 (20.4%)	
lsub			
None	9 (0.4%)	9 (2.9%)	0.105
Occluded/Covered	3 (0.1%)	9 (2.9%)	
Scallop/Fen/Branch/Chimney	7 (0.3%)	3 (1.0%)	
Missing	2357 (99.2%)	293 (93.3%)	
NUM_TREATED_BRANCHES			

	Asymptomatic	Symptomatic	P-value
1	285 (12.0%)	53 (16.9%)	<0.001
2	560 (23.6%)	60 (19.1%)	
3	794 (33.4%)	63 (20.1%)	
4	737 (31.0%)	138 (43.9%)	
NUM_TREATED_RENALS			
0	330 (13.9%)	70 (22.3%)	<0.001
1	85 (3.6%)	23 (7.3%)	
2	1961 (82.5%)	221 (70.4%)	
OCCLUDED_RENAL			
Yes	63 (2.7%)	19 (6.1%)	0.002
No	2313 (97.3%)	295 (93.9%)	
OCCLUDED_SMA			
Yes	3 (0.1%)	0 (0%)	1
No	2373 (99.9%)	314 (100%)	
OCCLUDED_CELIAC			
Yes	53 (2.2%)	21 (6.7%)	<0.001
No	2323 (97.8%)	293 (93.3%)	

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	P-value
	(N=2376)	(N=314)	
DEAD			
Yes	296 (12.5%)	68 (21.7%)	<0.001
No	2080 (87.5%)	246 (78.3%)	
PROC_SURVIVALDAYS			
Mean (SD)	723 (743)	598 (729)	0.005
Median [Min, Max]	435 [0, 3390]	337 [0, 3290]	

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

	Asymptomatic	Symptomatic	P-value
	(N=2376)	(N=314)	
TOTAL_LOS			
Mean (SD)	6.33 (21.2)	12.7 (30.5)	<0.001
Median [Min, Max]	3.00 [0, 372]	8.00 [1.00, 376]	
POSTOP_LOS			
Mean (SD)	5.64 (19.4)	8.02 (8.86)	<0.001
Median [Min, Max]	3.00 [0, 372]	5.00 [0, 80.0]	
AORDEV_TECHSUCC			
No	66 (2.8%)	12 (3.8%)	0.318
Yes	2139 (90.0%)	267 (85.0%)	
Missing	171 (7.2%)	35 (11.1%)	
CONVTOOPEN			
No	2366 (99.6%)	313 (99.7%)	1
Yes	10 (0.4%)	1 (0.3%)	

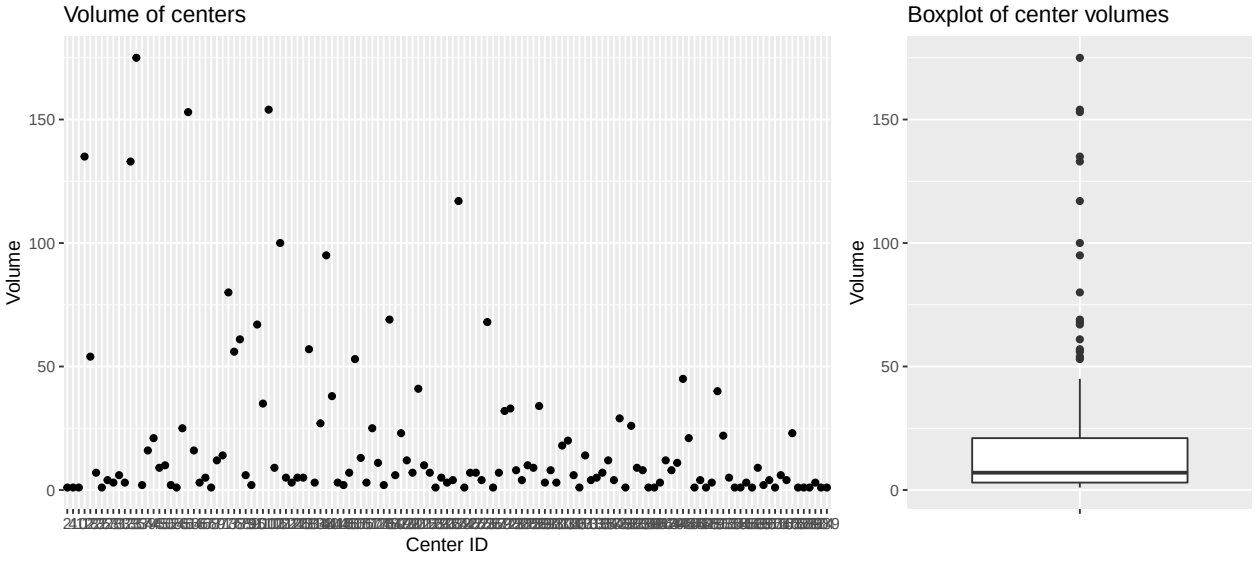
	Asymptomatic	Symptomatic	P-value
LEAKATCOMP_NONE			
No	794 (33.4%)	90 (28.7%)	0.862
Yes	1528 (64.3%)	179 (57.0%)	
Missing	54 (2.3%)	45 (14.3%)	
ICUSTAY			
Mean (SD)	2.13 (4.60)	4.25 (5.52)	<0.001
Median [Min, Max]	1.00 [0, 85.0]	3.00 [0, 49.0]	
Missing	2 (0.1%)	1 (0.3%)	
POSTOP_PRBC			
Mean (SD)	1.25 (4.09)	2.20 (4.29)	<0.001
Median [Min, Max]	0 [0, 77.0]	0 [0, 38.0]	
Missing	1 (0.0%)	0 (0%)	
POSTOP_VASO			
No	1979 (83.3%)	222 (70.7%)	<0.001
Yes	395 (16.6%)	92 (29.3%)	
Missing	2 (0.1%)	0 (0%)	
POSTOP_HIGHCREAT			
Mean (SD)	1.47 (1.12)	1.88 (1.87)	<0.001
Median [Min, Max]	1.19 [0.0100, 15.4]	1.20 [0.450, 11.8]	
Missing	15 (0.6%)	4 (1.3%)	
POSTOP_COMPLICATIONS			
No	1896 (79.8%)	219 (69.7%)	<0.001
Yes	479 (20.2%)	95 (30.3%)	
Missing	1 (0.0%)	0 (0%)	
ACCESS_COMPLICATION			
No	428 (18.0%)	56 (17.8%)	0.258
Yes	29 (1.2%)	7 (2.2%)	
Missing	1919 (80.8%)	251 (79.9%)	
POSTOP_AH			
No	2143 (90.2%)	277 (88.2%)	0.319
Yes	233 (9.8%)	37 (11.8%)	
POSTOP_CEREBROSX			
No	2347 (98.8%)	304 (96.8%)	0.01
Yes	28 (1.2%)	10 (3.2%)	
Missing	1 (0.0%)	0 (0%)	
POSTOP_RESPIRATORY			
No	2266 (95.4%)	280 (89.2%)	<0.001
Yes	110 (4.6%)	34 (10.8%)	
POSTOP_DIALYSIS			
No	2297 (96.7%)	284 (90.4%)	<0.001
Yes	46 (1.9%)	17 (5.4%)	
Missing	33 (1.4%)	13 (4.1%)	
POSTOP_ARMEMBO			
No	2365 (99.5%)	312 (99.4%)	1
Yes	11 (0.5%)	2 (0.6%)	
POSTOP_LEGEMBO			
No	2320 (97.6%)	297 (94.6%)	0.003
Yes	56 (2.4%)	17 (5.4%)	
POSTOP_LEGCOMPART			
No	2352 (99.0%)	310 (98.7%)	0.891
Yes	24 (1.0%)	4 (1.3%)	
POSTOP_INTISCH			

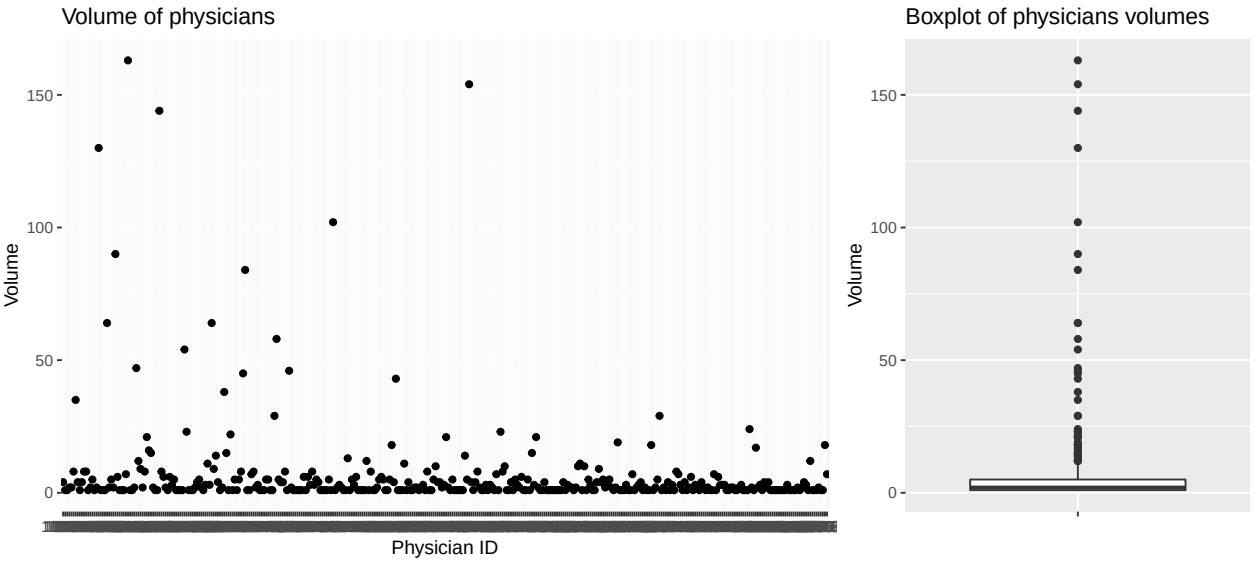
	Asymptomatic	Symptomatic	P-value
No	2329 (98.0%)	307 (97.8%)	0.933
Yes	47 (2.0%)	7 (2.2%)	
POSTOP_RENALISCH			
No	2300 (96.8%)	302 (96.2%)	0.679
Yes	76 (3.2%)	12 (3.8%)	
POSTOP_SPINAL_ISCHEMIA			
No	2301 (96.8%)	291 (92.7%)	<0.001
Yes	75 (3.2%)	23 (7.3%)	
RETX_R_RTOR			
No	2230 (93.9%)	279 (88.9%)	0.001
Yes	146 (6.1%)	35 (11.1%)	
DC_STATUS			
Dead	65 (2.7%)	17 (5.4%)	<0.001
Home	1999 (84.1%)	220 (70.1%)	
Homeless	1 (0.0%)	1 (0.3%)	
Nursing Home	86 (3.6%)	22 (7.0%)	
Other Hospital	21 (0.9%)	14 (4.5%)	
Rehab Unit	204 (8.6%)	40 (12.7%)	
BRANCH_POST			
No	2042 (85.9%)	231 (73.6%)	<0.001
Yes	332 (14.0%)	82 (26.1%)	
Missing	2 (0.1%)	1 (0.3%)	

Number of re-intervention table

Volume Variables

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





19 regions, 133 centers, 366 physicians.

Quantiles of centers' volume: 1, 3, 7, 21, 175

Quantiles of physicians' volume: 1, 1, 2, 5, 163

Code Appendix

```
knitr::opts_chunk$set(echo = FALSE,message = FALSE,warning = FALSE,fig.width = 10)
library(tidyverse)
library(table1)
library(survival)
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")
path_lily = c("../data/TEVAR_PROC.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)
TEVAR_PROC = 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])

## ------------- modify variables class----------

names <- c('NUM_TREATED_BRANCHES', 'NUM_TREATED_RENALS')
TEVAR_PROC[,names] <- lapply(TEVAR_PROC[,names] , factor)


## ------------- p-value function ----------

pvalue <- function(x, ...) {
    y <- unlist(x)
    g <- factor(rep(1:length(x), times=sapply(x, length)))
    if (is.numeric(y)) {
        # For numeric variables, Welch's Two Sample t-test
        p <- t.test(y ~ g)$p.value
    } else {
        # For categorical variables, Pearson's Chi-squared Test
        p <- chisq.test(table(y, g))$p.value
    }
    c("", sub("<", "&lt;", format.pval(p, digits=3, eps=0.001)))
}
```

```
## ------------- population of interest ----------
table1_POI = table1(~  PRESENTATION, data = TEVAR_PROC)
knitr::kable(table1_POI)
## ------------- table: Patient demographic and co-morbidities----------

table1_CMB = table1(~   AGE+AGECAT+GENDER+ETHNICITY+ RACE+ TRANSFER+ PRIMARYINSURER+ LIVINGSTATUS+ PREOI
       | PRESENTATION, data = TEVAR_PROC,overall=F, extra.col=list(`P-value`=pvalue))
knitr::kable(table1_CMB)

## ------------- table:  Operative Variables----------

table1_OPR = table1(~ PRIOR_AORSURG+ PATHOLOGY+ PREOP_MAXAAADIA+ URGENCY+ PATHOLOGY_ANEURYSM_TYPE+ PATHO
       | PRESENTATION, data = TEVAR_PROC,overall=F, extra.col=list(`P-value`=pvalue))

knitr::kable(table1_OPR)

## ------------- table: primary outcomes----------
table1_POC = table1(~ DEAD+PROC_SURVIVALDAYS | PRESENTATION, data = TEVAR_PROC,overall=F, extra.col=list

knitr::kable(table1_POC)

## ------------- table: secondary outcomes----------
table1_SOC = table1(~ TOTAL_LOS+ POSTOP_LOS+ AORDEV_TECHSUCC+ CONVTOOPEN+ LEAKATCOMP_NONE+ ICUSTAY+ POST
       | PRESENTATION, data = TEVAR_PROC,overall=F, extra.col=list(`P-value`=pvalue))

knitr::kable(table1_SOC)

## ------------- table: number of re-intervention ----------


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

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

## ------------- plots of volume----------
center_vol = as.data.frame(TEVAR_PROC %>% select(CENTERID) %>% table())
phys_vol = as.data.frame(TEVAR_PROC %>% 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"))
```