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=3744)
PRESENTATION	
Asymptomatic	3308 (88.4%)
Symptomatic	436 (11.6%)

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=3308)	(N=436)	
AGE			
Mean (SD)	73.5 (7.87)	70.9 (10.2)	<0.001
Median [Min, Max]	74.0 [0, 90.0]	72.0 [33.0, 90.0]	
AGECAT			
<50	19 (0.6%)	14 (3.2%)	<0.001
>79	746 (22.6%)	88 (20.2%)	
50-59	106 (3.2%)	44 (10.1%)	
60-69	853 (25.8%)	112 (25.7%)	
70-79	1584 (47.9%)	178 (40.8%)	
GENDER			
female	802 (24.2%)	176 (40.4%)	<0.001
male	2506 (75.8%)	260 (59.6%)	
ETHNICITY			
Hispanic or Latino	116 (3.5%)	15 (3.4%)	1
None Hispanic or Latino	3181 (96.2%)	420 (96.3%)	
Missing	11 (0.3%)	1 (0.2%)	
RACE			
American Indian or Alaskan Native	8 (0.2%)	1 (0.2%)	<0.001
Asian	68 (2.1%)	10 (2.3%)	
Black or African American	220 (6.7%)	61 (14.0%)	
More than 1 race	5 (0.2%)	1 (0.2%)	

	Asymptomatic	Symptomatic	P-value
Native Hawaiian or other Pacific Islander	2 (0.1%)	1 (0.2%)	
Unknown/Other	225 (6.8%)	50 (11.5%)	
White	2780 (84.0%)	312 (71.6%)	
TRANSFER			
Hospital	51 (1.5%)	213 (48.9%)	<0.001
No	3255 (98.4%)	222 (50.9%)	
Rehab Unit	2 (0.1%)	1 (0.2%)	
PRIMARYINSURER			
Commercial	788 (23.8%)	111 (25.5%)	<0.001
Medicaid	71 (2.1%)	30 (6.9%)	
Medicare	1756 (53.1%)	206 (47.2%)	
Military/VA	131 (4.0%)	13 (3.0%)	
Non US Insurance	192 (5.8%)	10 (2.3%)	
Self Pay	14 (0.4%)	12 (2.8%)	
Missing	356 (10.8%)	54 (12.4%)	
LIVINGSTATUS			
Home	3282 (99.2%)	429 (98.4%)	0.22
Homeless	3 (0.1%)	1 (0.2%)	
Nursing home	23 (0.7%)	6 (1.4%)	
PREOP_FUNCSTATUS			
Assisted care	53 (1.6%)	22 (5.0%)	<0.001
Bed bound	5 (0.2%)	1 (0.2%)	
Full	2037 (61.6%)	242 (55.5%)	
Light work	831 (25.1%)	115 (26.4%)	
Self care	380 (11.5%)	55 (12.6%)	
Missing	2 (0.1%)	1 (0.2%)	
PRIOR_CVD			
No	2941 (88.9%)	374 (85.8%)	0.065
Yes	367 (11.1%)	62 (14.2%)	
PRIOR_CAD			
No	2365 (71.5%)	293 (67.2%)	0.083
Yes	943 (28.5%)	142 (32.6%)	
Missing	0 (0%)	1 (0.2%)	
PRIOR_CHF			
No	2804 (84.8%)	353 (81.0%)	0.048
Yes	504 (15.2%)	83 (19.0%)	
COPD			
No	1950 (58.9%)	244 (56.0%)	0.255
Yes	1358 (41.1%)	192 (44.0%)	
DIABETES			
No	2688 (81.3%)	351 (80.5%)	0.754
Yes	620 (18.7%)	85 (19.5%)	
PREOP_DIALYSIS			
No	3250 (98.2%)	419 (96.1%)	0.005
Yes	58 (1.8%)	17 (3.9%)	
HTN			
No	336 (10.2%)	34 (7.8%)	0.147
Yes	2965 (89.6%)	400 (91.7%)	
Missing	7 (0.2%)	2 (0.5%)	
PREOP_SMOKING			
No	359 (10.9%)	61 (14.0%)	0.059
Yes	2949 (89.1%)	374 (85.8%)	

	Asymptomatic	Symptomatic	P-value
Missing	0 (0%)	1 (0.2%)	
PRIOR_CABG			
No	2714 (82.0%)	362 (83.0%)	0.68
Yes	592 (17.9%)	74 (17.0%)	
Missing	2 (0.1%)	0 (0%)	
PRIOR_PCI			
No	2543 (76.9%)	346 (79.4%)	0.249
Yes	762 (23.0%)	89 (20.4%)	
Missing	3 (0.1%)	1 (0.2%)	
PRIOR_ANEURREP			
No	2550 (77.1%)	291 (66.7%)	<0.001
Yes	758 (22.9%)	145 (33.3%)	
STRESS			
No	1715 (51.8%)	338 (77.5%)	<0.001
Yes	1590 (48.1%)	98 (22.5%)	
Missing	3 (0.1%)	0 (0%)	
PREOP_CREAT			
Mean (SD)	1.17 (0.613)	1.16 (0.689)	0.753
Median [Min, Max]	1.07 [0, 14.4]	1.00 [0.340, 7.50]	
Missing	73 (2.2%)	15 (3.4%)	
DC_ASA			
No	457 (13.8%)	53 (12.2%)	0.54
Yes	2766 (83.6%)	357 (81.9%)	
Missing	85 (2.6%)	26 (6.0%)	
DC_P2Y			
No	1378 (41.7%)	213 (48.9%)	<0.001
Yes	1844 (55.7%)	197 (45.2%)	
Missing	86 (2.6%)	26 (6.0%)	
DC_STATIN			
No	537 (16.2%)	62 (14.2%)	0.471
Yes	2686 (81.2%)	348 (79.8%)	
Missing	85 (2.6%)	26 (6.0%)	

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=3308)	(N=436)	
PRIOR_AORSURG			
Both	87 (2.6%)	14 (3.2%)	<0.001
Endo	403 (12.2%)	93 (21.3%)	
None	2564 (77.5%)	280 (64.2%)	
Open	254 (7.7%)	49 (11.2%)	
PATHOLOGY			
Aneurysm	3173 (95.9%)	356 (81.7%)	<0.001
Aneurysm from dissection	77 (2.3%)	26 (6.0%)	
Dissection	36 (1.1%)	37 (8.5%)	
PAU/IMH	22 (0.7%)	17 (3.9%)	
PREOP_MAXAAADIA			
Mean (SD)	61.2 (10.5)	65.8 (18.1)	<0.001

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	Asymptomatic	Symptomatic	P-value
Median [Min, Max]	60.0 [5.00, 130]	62.0 [5.50, 190]	
Missing	17 (0.5%)	7 (1.6%)	
URGENCY			
Elective	3274 (99.0%)	241 (55.3%)	<0.001
Emergent	2 (0.1%)	32 (7.3%)	
Urgent	32 (1.0%)	163 (37.4%)	
PATHOLOGY_ANEURYSM_TYPE			
Anastomotic	37 (1.1%)	8 (1.8%)	<0.001
Degenerative, fusiform	2750 (83.1%)	295 (67.7%)	
Degenerative, saccular	290 (8.8%)	38 (8.7%)	
Intercostal or visceral patch	14 (0.4%)	1 (0.2%)	
Prior trauma	0 (0%)	2 (0.5%)	
Missing	217 (6.6%)	92 (21.1%)	
PATHOLOGY_DISSECT_TYPE			
Acute, <= 30 days	5 (0.2%)	34 (7.8%)	<0.001
Chronic, >30 days	108 (3.3%)	29 (6.7%)	
Missing	3195 (96.6%)	373 (85.6%)	
PROXZONE_DISEASE			
Mean (SD)	6.74 (1.62)	5.58 (1.97)	<0.001
Median [Min, Max]	7.00 [2.00, 9.00]	5.00 [2.00, 9.00]	
GENHIST			
Ehlers-Danlos	1 (0.0%)	1 (0.2%)	0.512
Loeys-Dietz	1 (0.0%)	0 (0%)	
Marfans	12 (0.4%)	2 (0.5%)	
Non-specific	88 (2.7%)	10 (2.3%)	
None	3203 (96.8%)	423 (97.0%)	
Missing	3 (0.1%)	0 (0%)	
DISTZONE_DISEASE			
10B	710 (21.5%)	89 (20.4%)	<0.001
10L	129 (3.9%)	14 (3.2%)	
10R	193 (5.8%)	18 (4.1%)	
11B	64 (1.9%)	10 (2.3%)	
11L	36 (1.1%)	6 (1.4%)	
11R	39 (1.2%)	10 (2.3%)	
4	1 (0.0%)	1 (0.2%)	
5	21 (0.6%)	4 (0.9%)	
6	24 (0.7%)	12 (2.8%)	
7	27 (0.8%)	18 (4.1%)	
8	158 (4.8%)	30 (6.9%)	
9	1906 (57.6%)	224 (51.4%)	
extent			
Juxtarenal AAA	1345 (40.7%)	94 (21.6%)	<0.001
Type 1 TAAA	9 (0.3%)	4 (0.9%)	
Type 2 TAAA	134 (4.1%)	67 (15.4%)	
Type 3 TAAA	533 (16.1%)	114 (26.1%)	
Type 4 TAAA	1046 (31.6%)	110 (25.2%)	
Type 5 TAAA	53 (1.6%)	15 (3.4%)	
Missing	188 (5.7%)	32 (7.3%)	
ANESTHESIA			
General	3271 (98.9%)	428 (98.2%)	0.228
Local	21 (0.6%)	6 (1.4%)	
Regional	16 (0.5%)	2 (0.5%)	

	Asymptomatic	Symptomatic	P-value
CONTRAST			
Mean (SD)	127 (70.5)	129 (80.2)	0.632
Median [Min, Max]	115 [0, 677]	115 [0, 501]	
Missing	75 (2.3%)	11 (2.5%)	
EBL			
Mean (SD)	417 (695)	406 (445)	0.676
Median [Min, Max]	250 [0, 25000]	250 [0, 3000]	
Missing	34 (1.0%)	7 (1.6%)	
FLUOROTIME			
Mean (SD)	73.9 (38.9)	71.5 (44.1)	0.307
Median [Min, Max]	65.9 [1.00, 320]	64.2 [6.80, 285]	
Missing	168 (5.1%)	25 (5.7%)	
INTRAOP_PRBC			
Mean (SD)	0.595 (3.92)	1.03 (1.97)	<0.001
Median [Min, Max]	0 [0, 200]	0 [0, 16.0]	
Missing	3 (0.1%)	2 (0.5%)	
TOTALPROCTIME			
Mean (SD)	252 (111)	265 (129)	0.035
Median [Min, Max]	230 [25.0, 911]	237 [52.0, 852]	
Missing	3 (0.1%)	1 (0.2%)	
IVUSTEE			
Both	29 (0.9%)	5 (1.1%)	<0.001
IVUS	512 (15.5%)	129 (29.6%)	
No	2718 (82.2%)	290 (66.5%)	
TEE	34 (1.0%)	12 (2.8%)	
Missing	15 (0.5%)	0 (0%)	
ACCESS			
Open	1062 (32.1%)	145 (33.3%)	0.34
Percutaneous	1968 (59.5%)	240 (55.0%)	
Missing	278 (8.4%)	51 (11.7%)	
ARMNECK_ACCESS			
No	2557 (77.3%)	280 (64.2%)	<0.001
Yes	751 (22.7%)	156 (35.8%)	
AORDEV_NUM			
Mean (SD)	2.22 (0.897)	2.55 (1.24)	<0.001
Median [Min, Max]	2.00 [1.00, 6.00]	2.00 [1.00, 6.00]	
AORDEV_CMOD			
No	808 (24.4%)	100 (22.9%)	0.533
Yes	2500 (75.6%)	336 (77.1%)	
DEV_GTYPE			
Custom	1583 (47.9%)	93 (21.3%)	<0.001
Physician modified	832 (25.2%)	212 (48.6%)	
Standard	893 (27.0%)	131 (30.0%)	
ILIACDEV_END_R			
Common	1966 (59.4%)	179 (41.1%)	0.111
External, Unintended	20 (0.6%)	4 (0.9%)	
External,Intended	241 (7.3%)	33 (7.6%)	
None	24 (0.7%)	2 (0.5%)	
Missing	1057 (32.0%)	218 (50.0%)	
ILIACDEV_END_L			
Common	1980 (59.9%)	177 (40.6%)	0.055
External, Unintended	12 (0.4%)	4 (0.9%)	

	Asymptomatic	Symptomatic	P-value
External,Intended	197 (6.0%)	23 (5.3%)	
None	24 (0.7%)	1 (0.2%)	
Missing	1095 (33.1%)	231 (53.0%)	
BRANCH_STAGED			
No	3116 (94.2%)	398 (91.3%)	0.014
Yes	185 (5.6%)	38 (8.7%)	
Missing	7 (0.2%)	0 (0%)	
BRANCH_LSUB			
No	3245 (98.1%)	391 (89.7%)	<0.001
Yes	63 (1.9%)	45 (10.3%)	
BRANCH_CELIAC			
No	1450 (43.8%)	77 (17.7%)	<0.001
Yes	1858 (56.2%)	359 (82.3%)	
BRANCH_SMA			
No	416 (12.6%)	26 (6.0%)	<0.001
Yes	2892 (87.4%)	410 (94.0%)	
BRANCH_RRENAL			
No	24 (0.7%)	18 (4.1%)	<0.001
Yes	3284 (99.3%)	418 (95.9%)	
BRANCH_LRENAL			
No	24 (0.7%)	18 (4.1%)	<0.001
Yes	3284 (99.3%)	418 (95.9%)	
ANESTHESIA_GEN_TIMEEXT			
<12 hrs	150 (4.5%)	31 (7.1%)	<0.001
>24 hrs	75 (2.3%)	29 (6.7%)	
12-24 hrs	80 (2.4%)	22 (5.0%)	
In OR	2959 (89.4%)	343 (78.7%)	
Missing	44 (1.3%)	11 (2.5%)	
POSTOP_SPINALDRAIN			
No	2745 (83.0%)	293 (67.2%)	<0.001
Yes	563 (17.0%)	143 (32.8%)	
lrenal			
None	307 (9.3%)	39 (8.9%)	<0.001
Occluded/Covered	100 (3.0%)	29 (6.7%)	
Scallop/Fen/Branch/Chimney	2869 (86.7%)	349 (80.0%)	
Missing	32 (1.0%)	19 (4.4%)	
rrenal			
None	340 (10.3%)	64 (14.7%)	<0.001
Occluded/Covered	96 (2.9%)	27 (6.2%)	
Scallop/Fen/Branch/Chimney	2751 (83.2%)	314 (72.0%)	
Missing	121 (3.7%)	31 (7.1%)	
sma			
None	243 (7.3%)	36 (8.3%)	0.846
Occluded/Covered	4 (0.1%)	1 (0.2%)	
Scallop/Fen/Branch/Chimney	2638 (79.7%)	372 (85.3%)	
Missing	423 (12.8%)	27 (6.2%)	
celiac			
None	365 (11.0%)	58 (13.3%)	0.058
Occluded/Covered	96 (2.9%)	28 (6.4%)	
Scallop/Fen/Branch/Chimney	1390 (42.0%)	273 (62.6%)	
Missing	1457 (44.0%)	77 (17.7%)	
lsub			

	Asymptomatic	Symptomatic	P-value
None	14 (0.4%)	13 (3.0%)	0.221
Occluded/Covered	6 (0.2%)	12 (2.8%)	
Scallop/Fen/Branch/Chimney	10 (0.3%)	6 (1.4%)	
Missing	3278 (99.1%)	405 (92.9%)	
NUM_TREATED_BRANCHES			
1	353 (10.7%)	64 (14.7%)	<0.001
2	734 (22.2%)	81 (18.6%)	
3	1057 (32.0%)	82 (18.8%)	
4	1164 (35.2%)	209 (47.9%)	
NUM_TREATED_RENALS			
0	439 (13.3%)	87 (20.0%)	<0.001
1	118 (3.6%)	35 (8.0%)	
2	2751 (83.2%)	314 (72.0%)	
OCCLUDED_RENAL			
Yes	100 (3.0%)	29 (6.7%)	<0.001
No	3208 (97.0%)	407 (93.3%)	
OCCLUDED_SMA			
Yes	4 (0.1%)	1 (0.2%)	1
No	3304 (99.9%)	435 (99.8%)	
OCCLUDED_CELIAC			
Yes	96 (2.9%)	28 (6.4%)	<0.001
No	3212 (97.1%)	408 (93.6%)	

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=3308)	(N=436)	
DEAD			
Yes	333 (10.1%)	81 (18.6%)	<0.001
No	2975 (89.9%)	355 (81.4%)	
PROC_SURVIVALDAYS			
Mean (SD)	545 (698)	454 (670)	0.008
Median [Min, Max]	330 [-96.0, 3390]	146 [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=3308)	(N=436)	
TOTAL_LOS			
Mean (SD)	6.17 (19.5)	12.2 (26.5)	<0.001
Median [Min, Max]	3.00 [0, 374]	7.00 [1.00, 376]	
POSTOP_LOS			
Mean (SD)	5.37 (16.8)	7.95 (8.49)	<0.001
Median [Min, Max]	3.00 [0, 372]	5.50 [0, 80.0]	
AORDEV_TECHSUCC			
No	106 (3.2%)	16 (3.7%)	0.628

	Asymptomatic	Symptomatic	P-value
Yes	3030 (91.6%)	385 (88.3%)	
Missing	172 (5.2%)	35 (8.0%)	
CONVTOOPEN			
No	3294 (99.6%)	433 (99.3%)	0.693
Yes	14 (0.4%)	3 (0.7%)	
LEAKATCOMP_NONE			
No	1069 (32.3%)	123 (28.2%)	0.867
Yes	2159 (65.3%)	255 (58.5%)	
Missing	80 (2.4%)	58 (13.3%)	
ICUSTAY			
Mean (SD)	2.13 (4.20)	4.19 (5.52)	<0.001
Median [Min, Max]	1.00 [0, 85.0]	3.00 [0, 49.0]	
Missing	4 (0.1%)	2 (0.5%)	
POSTOP_PRBC			
Mean (SD)	1.16 (3.69)	2.14 (4.09)	<0.001
Median [Min, Max]	0 [0, 77.0]	0 [0, 38.0]	
Missing	1 (0.0%)	1 (0.2%)	
POSTOP_VASO			
Mean (SD)	1.46 (1.12)	1.80 (1.75)	<0.001
Median [Min, Max]	1.18 [0.0100, 15.4]	1.20 [0.450, 11.8]	
Missing	22 (0.7%)	4 (0.9%)	
POSTOP_HIGHCREAT			
No	2747 (83.0%)	299 (68.6%)	<0.001
Yes	559 (16.9%)	137 (31.4%)	
Missing	2 (0.1%)	0 (0%)	
POSTOP_COMPLICATIONS			
No	2666 (80.6%)	305 (70.0%)	<0.001
Yes	641 (19.4%)	131 (30.0%)	
Missing	1 (0.0%)	0 (0%)	
ACCESS_COMPLICATION			
No	1248 (37.7%)	153 (35.1%)	0.104
Yes	60 (1.8%)	13 (3.0%)	
Missing	2000 (60.5%)	270 (61.9%)	
POSTOP_AH			
No	2989 (90.4%)	381 (87.4%)	0.063
Yes	319 (9.6%)	55 (12.6%)	
POSTOP_CEREBROSX			
No	3275 (99.0%)	421 (96.6%)	<0.001
Yes	32 (1.0%)	15 (3.4%)	
Missing	1 (0.0%)	0 (0%)	
POSTOP_RESPIRATORY			
No	3164 (95.6%)	390 (89.4%)	<0.001
Yes	144 (4.4%)	46 (10.6%)	
POSTOP_DIALYSIS			
No	3198 (96.7%)	400 (91.7%)	<0.001
Yes	64 (1.9%)	22 (5.0%)	
Missing	46 (1.4%)	14 (3.2%)	
POSTOP_ARMEMBO			
No	3297 (99.7%)	434 (99.5%)	1
Yes	11 (0.3%)	2 (0.5%)	
POSTOP_LEGEMBO			
No	3240 (97.9%)	417 (95.6%)	0.005

	Asymptomatic	Symptomatic	P-value
Yes	68 (2.1%)	19 (4.4%)	
POSTOP_LEGCOMPART			
No	3274 (99.0%)	432 (99.1%)	1
Yes	34 (1.0%)	4 (0.9%)	
POSTOP_INTISCH			
No	3246 (98.1%)	425 (97.5%)	0.461
Yes	62 (1.9%)	11 (2.5%)	
POSTOP_RENALISCH			
No	3211 (97.1%)	420 (96.3%)	0.486
Yes	97 (2.9%)	16 (3.7%)	
POSTOP_SPINAL_ISCHEMIA			
No	3206 (96.9%)	401 (92.0%)	<0.001
Yes	102 (3.1%)	35 (8.0%)	
RETX_R_RTOR			
No	3100 (93.7%)	384 (88.1%)	<0.001
Yes	207 (6.3%)	52 (11.9%)	
Missing	1 (0.0%)	0 (0%)	
DC_STATUS			
Dead	81 (2.4%)	25 (5.7%)	<0.001
Home	2832 (85.6%)	305 (70.0%)	
Homeless	1 (0.0%)	1 (0.2%)	
Nursing Home	100 (3.0%)	24 (5.5%)	
Other Hospital	29 (0.9%)	16 (3.7%)	
Rehab Unit	264 (8.0%)	65 (14.9%)	
Missing	1 (0.0%)	0 (0%)	
BRANCH_POST			
No	2831 (85.6%)	315 (72.2%)	<0.001
Yes	475 (14.4%)	120 (27.5%)	
Missing	2 (0.1%)	1 (0.2%)	

Number of re-intervention table

Volume Variables

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

Volume of centers

Boxplot of center volumes

Volume of physicians

Boxplot of physicians volumes
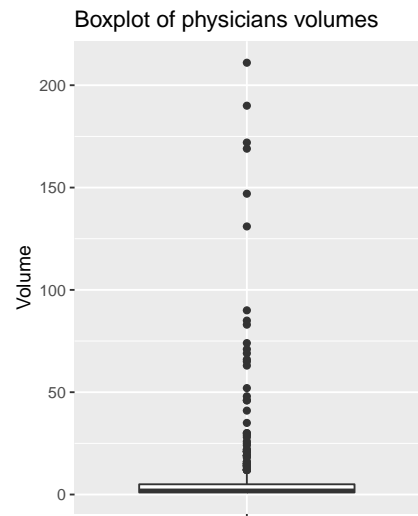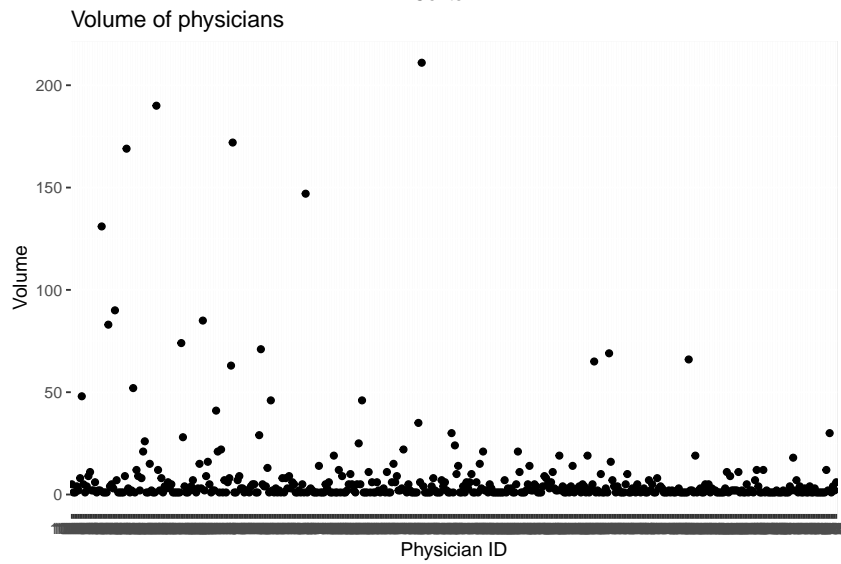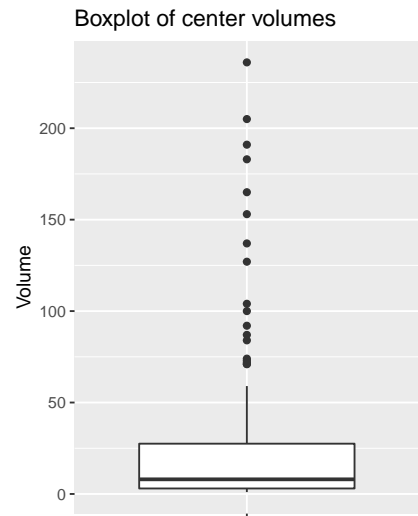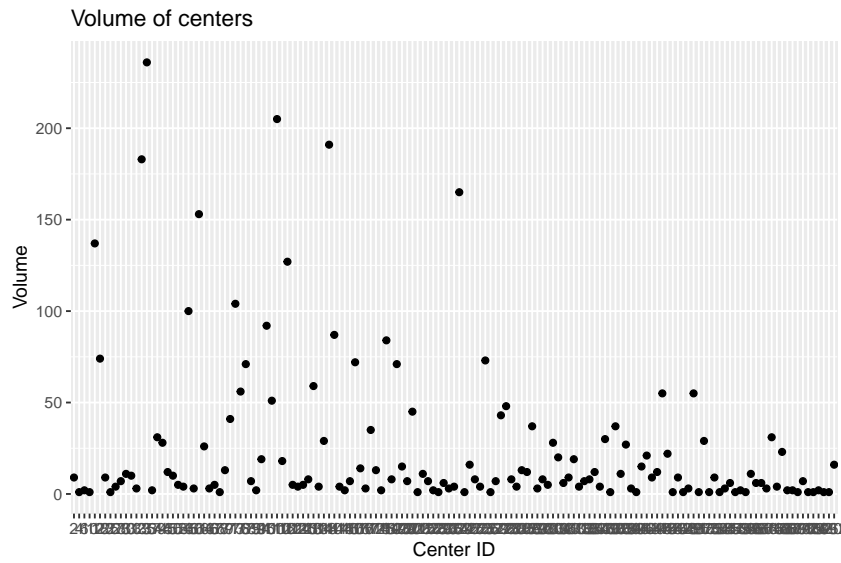
19 regions, 147 centers, 462 physicians.

Quantiles of centers' volume: 1, 3, 8, 27.5, 236

Quantiles of physicians' volume: 1, 1, 2, 5, 211

Code Appendix

```r
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)))
}
```

```r
## ------------- 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+ PREOP
        | 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=lis

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"))
```