

## Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

**eTable 1.** Demographic and summary data by subgroup of overlapping surgery

Variable	OS-R N = 231	OS-StS N = 1072	p-value
Patient Characteristics			
Sex – n (%)			
Female	141 (61)	613 (57)	0.28
Male	90 (39)	459 (43)	
Age (years) – mean (SD)	51.9 (16.7)	52.3 (16.2)	0.75
ASA Score – n (%)			
1-2	68 (29)	344 (32)	0.43
≥ 3	163 (71)	728 (68)	
mRS at Baseline – n (%)			
0-2	176 (76)	879 (82)	0.04
3-5	55 (24)	193 (18)	
Surgery Characteristics			
Operative Times (Min) - Median (Q1, Q3)			
In-room (Total)	154 (120, 234)	232 (163, 306)	<0.001
Skin-to-Skin	78 (41, 148)	151 (89, 210)	<0.001
Surgical Staff – n (%)			
Co-Surgeon Present	32 (14)	271 (25)	<0.001
Fellow Present	34 (15)	181 (17)	0.42
Resident Present	215 (93)	969 (90)	0.20
Urgency – n (%)			
Elective	215 (93)	969 (90)	0.37
Emergent/Urgent	16 (7)	103 (10)	
Admission Status – n (%)			
Day Surgery	70 (30)	146 (14)	<0.001
Admitted	161 (70)	926 (86)	
Surgery Category – n (%)			
CSF Diversion	17 (7)	62 (6)	<0.001
Vascular	78 (34)	227 (21)	
Functional	10 (4)	60 (6)	
Other	41 (18)	105 (10)	
Peripheral Nerve	4 (2)	40 (4)	
Spine	58 (25)	421 (39)	
Tumor	23 (10)	157 (15)	

ASA: American Society of Anesthesiologists, CSF: cerebrospinal fluid, mRS: Modified Rankin Scale, SD: Standard deviation, OS-R: Overlapping surgery in-room, OS-StS: Overlapping surgery skin-to-skin

**eTable 2.** Surgical and outcomes data presented by subgroup of overlapping surgery

Variable	OS-R	OS-StS	p-value
	(N = 231)	(N = 1072)	
Operative Times (Min) - Median (Q1, Q3)			
In-room (Total)	154 (120, 234)	232 (163, 306)	<0.001
Skin-to-Skin	78 (41, 148)	151 (89, 210)	<0.001
Length of Stay (Days) – Median (Q1, Q3)			
ICU LOS	1 (1, 2)	1 (1, 4)	0.19
Overall LOS	2 (0,4)	3 (1, 6)	<0.001
Discharge Location – n (%)			
Good Disposition (Home or AR)	221 (96)	1016 (95)	0.57
Poor Disposition	10 (4)	56 (5)	
Mortality – n (%)	2 (1)	20 (2)	0.40
mRS at Discharge – n (%)			
0-2	169 (73)	804 (75)	0.56
3-6	62 (27)	268 (25)	
mRS at Follow-up vs Baseline – n (%)			
No	175 (76)	804 (81)	0.15
Unchanged Poor (3-5) or Worse	54 (24)	268 (19)	
Morbidity within 90 Days – n (%)			
N	203 (87)	902 (86)	0.25
Y	26 (11)	150 (14)	
Severity of Morbidity – n (%)			
Clavien 1 or 2	10 (38)	50 (33)	0.61
Clavien 3 or 4	16 (62)	100 (67)	
30-Day Readmission – n (%)			
N	205 (89)	984 (92)	0.14
Y	26 (11)	88 (8)	
Unexpected Return to OR or Invasive Procedure within 90 days – n (%)			
N	219 (95)	1010 (94)	0.73
Y	12 (5)	62 (6)	
Surgical Site Infection – n (%)			
N	221 (96)	1031 (96)	0.72
Y	10 (4)	41 (4)	
Multiple Related surgeries – n (%)			
N	228 (99)	1029 (96)	0.04
Y	3 (1)	43 (4)	

AR: Acute Rehabilitation, ICU: intensive care unit, LOS: Length of Stay, mRS: Modified Rankin Scale, OR: Operating room, Q1: First quartile, Q3: Third quartile

**eTable 3.** Bivariate analysis for factors associated with mortality, morbidity, and functional status

Variable	Mortality		p	Morbidity		p	mRS-90		p
	No (N = 2222)	Y (n = 53)		No (N = 1892)	Y (n = 324)		No (N = 1762)	Y (n = 459)	
Type of Overlap – n (%)									
No Overlap	941 (42)	31 (58)	0.019	793 (42)	148 (46)	0.19	739 (42)	201 (44)	0.47
Overlap	1281 (58)	22 (42)		1105 (58)	176 (54)		1023 (58)	258 (56)	
Operative Times (Min) - Median (Q1, Q3)									
In-room (Total)	207 (134, 292)	196 (155, 276)	0.97	202 (126, 284)	248 (170, 326.5)	<0.001	208 (138, 292)	201.5 (123, 292)	0.49
Skin-to-Skin	130 (64, 197)	137 (97, 183)	0.57	124 (59, 191)	164.5 (97.5, 224)	<0.001	131 (66, 196)	122 (57, 207)	0.63
Surgical Staff – n (%)									
Fellow Present	423 (19)	16 (30)	0.04	349 (18)	74 (23)	0.06	351 (20)	72 (16)	0.04
Resident Present	2028 (91)	52 (98)	0.08	1725 (91)	303 (94)	0.12	1590 (90)	437 (95)	<0.001
Admitted to ICU	928 (42)	51 (96)	<0.001	723 (38)	205 (63)	<0.001	727 (41)	201 (44)	0.33
Discharge Location – n (%)*									
Good Disposition (Home or AR)	2112 (95)	1 (2)	<0.001	1833 (97)	279 (86)	<0.001	1721 (98)	390 (85)	<0.001
Poor Disposition	110 (5)	52 (98)		65 (3)	45 (14)		41 (2)	69 (15)	
mRS at Discharge – n (%)									
0-2	1653 (74)	1 (2)	<0.001	1471 (77)	182 (56)	<0.001	1601 (91)	51 (11)	<0.001
3-5	569 (26)	52 (98)		427 (23)	142 (44)		161 (9)	408 (89)	
30-Day Readmission – n (%)									
N	2012 (91)	52 (98)	0.06	1849 (97)	163 (50)	<0.001	1597 (91)	414 (90)	0.77
Y	210 (9)	1 (2)		49 (3)	161 (50)		165 (9)	45 (10)	
Unexpected Return to OR or Invasive Procedure within 90 days – n (%)									
N	2064 (93)	53 (100)	0.05	1891 (100)	173 (53)	<0.001	1650 (94)	413 (90)	
Y	158 (7)	0 (0)		7 (0)	151		112 (6)	46 (10)	

					(47)				
Surgical Site Infection – n (%)									
N	2128 (96)	52 (98)	0.72	1893 (100)	235 (75)	<0.001	1697 (96)	430 (94)	0.01
Y	94 (4)	1 (2)		5 (0)	89 (27)		65 (4)	29 (6)	
Multiple Related Surgeries – N (%)									
N	2116 (96)	51 (96)	>0.99	1840 (97)	276 (85)	<0.001	1689 (96)	426 (93)	0.01
Y	106 (4)	2 (4)		58 (3)	48 (15)		73 (4)	33 (7)	

AR: Acute Rehabilitation, ICU: intensive care unit, LOS: Length of Stay, mRS: Modified Rankin Scale, mRS-90: Unchanged Poor (3-5) or Worse mRS at 90 Days, OR: Operating room, Q1: First quartile, Q3: Third quartile

**eTable 4.** Multivariable logistic regression for covariates associated with mortality, morbidity, and unchanged poor (3-5) or worse mRS score at 90 days for patients who underwent only 1 operation

Variable	Estimate	SE	OR	95%CI	p-value
<b>Mortality</b>					
OS (ref: NOS)	0.50	0.35	1.64	0.83 – 3.30	0.16
Admitted to ICU (ref: no)	3.10	0.72	22.14	5.40 – 90.85	<0.001
Overall LOS (days)	0.04	0.01	1.04	1.02 – 1.07	0.002
<b>Morbidity</b>					
OS (ref: NOS)	-0.21	0.12	0.81	0.64 – 1.04	0.09
Discharge mRS 3-5 (ref: 0-2)	-0.47	0.14	0.62	0.50 – 0.82	0.001
Admitted to ICU (ref: no)	0.52	0.14	1.70	1.28 – 2.19	<0.001
Total In-Room Time (min)	0.002	0.001	1.00	1.00 – 1.00	<0.001
Overall LOS (days)	0.065	0.01	1.07	1.05 – 1.09	<0.001
<b>Unchanged Poor (3-5) or Worse mRS at 90 Days vs Baseline</b>					
OS (ref: NOS)	-0.15	0.10	0.86	0.71 – 1.06	0.15
Resident present (ref: no)	0.71	0.22	2.03	1.32 – 3.11	0.001
Good disposition (ref: bad)	-2.26	0.32	0.11	0.06 – 0.20	<0.001
Overall LOS (days)	0.03	0.01	1.03	1.01 – 1.05	0.001

Model included logit (PS) and used ATT weights. ICU: Intensive care unit, LOS: Length of Stay, mRS: Modified Rankin Scale, NOS: nonoverlapping surgery, OS: Overlapping surgery