Effect of Advancing Age on Complication Rates Following Epilepsy Surgery

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Introduction

Historically, epilepsy surgery has not been offered to patients of advanced age because of concerns for increased rates of post-operative complications and morbidity. Although no specific age cutoff has been defined, many clinical studies have excluded patients older than 50 years. Presently, there is no definitive data to support this practice. As such, our group investigated the effect of advanced age on complication rates following epilepsy surgery. We hypothesized that increasing age would be associated with an increased number of postoperative complications.

Methods

Using the Truven MarketScan database, we performed a large, retrospective, cohort study of patients 18 years or older who underwent epilepsy surgery between the years 2000 and 2011. We examined both aggregate and individual post-operative complications. Additionally, multivariate logistic regression analysis was employed to determine complication-related odds ratios for both advanced age (age 50 years or older) and increasing 5-year age epochs after adjusting for other covariates.

Results

Figure 1: Incidence of epilepsy surgery across patient age

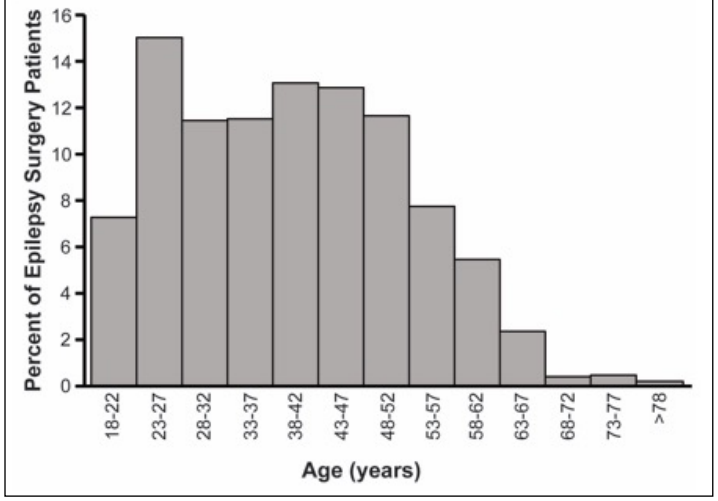

Table 1: Baseline demographic characteristics of patients undergoing epilepsy surgery

Variable	No. patients (%)
Total patients	709 (100.0)
Age	
Mean (SD)	47.7 (17.6)
Median (Q1, Q3)	47.0 (34.0 – 59.0)
Age group	
18 - 49	589 (83.1)
≥ 50	120 (16.9)
Sex	
Male	332 (46.8)
Female	377 (53.2)
Charlson Comorbidity Index	
0	218 (30.7)
≥ 1	491 (69.3)
Insurance type	
Commercial	522 (73.6)
Medicaid	177 (25.0)
Medicare	10 (1.4)

Data are presented as number (%) unless otherwise indicated
Q1 = quartile one, Q3 = quartile three, SD = standard deviation

Table 2: Complications following epilepsy surgery stratified by age

Outcome within 90 days post-operatively	Overall	Age 18 – 49 years	Age ≥ 50 years
Total patients, n	709	589	120
No complication	625 (88.2)	528 (89.6)	97 (80.8)
Any complication	84 (11.8)	61 (10.4)	23 (19.2)
Hemorrhagic complication	52 (7.3)	37 (6.3)	15 (12.5)
Infection	33 (4.7)	25 (4.2)	8 (6.7)
Pulmonary embolism	9 (1.3)	6 (1.0)	3 (2.5)
Pneumonia	10 (1.4)	3 (0.5)	7 (5.8)

Data are presented as number (%) unless otherwise indicated

Table 3: Effect of advanced age on post-operative complications within 90 days of epilepsy surgery

Predictor	Outcome	Odds Ratio (95% CI)	p value
Age (18 - 49 and ≥ 50)	All complications	1.11 (0.59 – 2.11)	0.744
	Hemorrhagic complications	1.28 (0.61 – 2.67)	0.513
	Infectious complications	1.14 (0.43, 3.05)	0.787
	Pulmonary embolism complications	n/a	n/a
	Pneumonia complications	5.57 (1.03 – 30.14)	0.046

CI = confidence interval
Data adjusted for differences in sex, Charlson Comorbidity Index, and insurance type using an adjusted regression analysis

Table 4: Effect of 10-year increase in age on post-operative complications within 90 days of epilepsy surgery

Outcome	Odds Ratio (95% CI)	p value
Complications		
All	0.93 (0.75, 1.14)	0.472
Hemorrhagic	1.01 (0.78, 1.29	0.964
Infectious	0.88 (0.64, 1.21)	0.436
Pulmonary embolism	0.62 (0.30, 1.28)	0.193
Pneumonia	1.63 (0.85, 3.13)	0.142

CI = confidence interval
Data adjusted for differences in sex, Charlson Comorbidity Index, and insurance type using an adjusted regression analysis

Conclusions

Older patients selected for epilepsy surgery showed a similar 90-day complication risk compared with their younger cohort. As such, our results suggest that age should not be a primary factor in determining one's candidacy for epilepsy surgery. Instead, a clear focus on patients with medication-refractory epilepsy and their candidacy for a variety of newer neuromodulation, neuroablative and neurosurgical treatment options should allow for expansion of the traditional therapeutic window.

Key Points:

1) Incidence of epilepsy surgery decreases sharply at around age 50

2) Post-operative complication rates following epilepsy surgery do not increase with increasing age

3) Unlike age, comorbidity burden does predict post-operative complications following epilepsy surgery