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Esophagectomy in the Octogenarian: Assessing Risk, Outcomes, and Trends in Surgical Approach

A NSQIP Database Analysis

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Introduction

Background

- Esophageal cancer is the eighth most common cancer worldwide and sixth in cancer-related mortality.
- Median age of diagnosis at 69 and 29.3% of new cases affecting patient above the age of 75.
- Esophagectomy carries a high risk of complications with 90-day mortality reported at 4.5% in contemporary series.
- Advanced age is a known reported risk factor associated with post-operative morbidity and mortality following esophagectomy and morbidity.

Current understanding:

- Conflicting evidence in age as an independent variable in esophagectomy out.
- Studies are limited by sample sizes, single center experiences, and heterogenous patient selection.
- Last NSQIP study used data from 2005 to 2014, showing age independently associated with adverse outcomes including mortality.

Need for update:

- Rapid adoption of minimally invasive approaches in esophagectomy that significantly improved mortality and morbidity in patients since the 2010s, with increase in minimally invasive or robotic-assisted esophagectomies of 49% and 704% respectively between 2010 and 2019.
- There has also been some data to suggest that the MIS may erase the age-difference in operative outcomes.
- The rise widespread adoption of minimally invasive approaches over open in recent years necessitates an update to existing literature.

Goal:

Evaluate practice patterns and approach to esophagectomy in patients over 80 years old.

Assess the postoperative complications, including 30-day morbidity, reintervention, reoperation, and mortality rates.

Elucidate the risks and realistic expectations of surgical intervention in this age group, to guide clinicians in patient selection, preoperative optimization, and shared decision-making for octogenarians with esophageal cancer.

Patient Characteristics

Age (median:range)	Age <80 65: 18-79		Age >80 82: 80-90		p-value
	Patients	%	Patients	%	
Sex (male)	8604	79.94	353	78.97	0.616
Diabetes					0.891
insulin dependent	648	6.02	27	6.04	
Non-insulin	1433	13.31	63	14.89	
non-diabetic	8682	80.67	357	79.87	
Smoking history (within 1 year)					<0.001
Yes	2572	23.9	29	6.49	
No	8191	76.1	418	93.51	
ASA					<0.001
1	23	0.21	0	0	
2	1475	13.71	38	0.52	
3	8273	76.89	341	76.46	
4	973	9.04	66	14.8	
Functional status					0.594
independent	10636	98.82	441	98.66	
partially	100	0.93	6	1.34	
totally dependent	13	0.12	0	0	
Obesity					<0.001
Normal	3513	32.64	166	37.14	
Overweight	3763	34.96	203	45.41	
Underweight	379	3.52	8	1.79	
Class I obesity	1983	18.42	55	12.3	
Class II obesity	737	6.85	10	2.24	
Class III obesity	388	3.6	5	1.12	
COPD					0.7
Yes	774	7.19	30	6.71	
No	9989	92.81	417	93.29	
Heart failure (within 30-days)					0.003
Yes	151	1.4	14	3.13	
No	10612	98.6	433	96.87	
Hypertension					<0.001
Yes	5159	47.93	303	67.79	
No	5604	52.07	144	32.21	
Bleeding disorder					0.037
Yes	105	4.05	10	7.87	
No	2485	95.95	117	92.13	
Fall within 6 months					<0.001
Yes	20	0.51	12	6.59	
No	440	11.27	156	85.71	

Table 1. Patient characteristics and clinical risk factors of young (<80) and octogenarian patients who underwent esophagectomy.

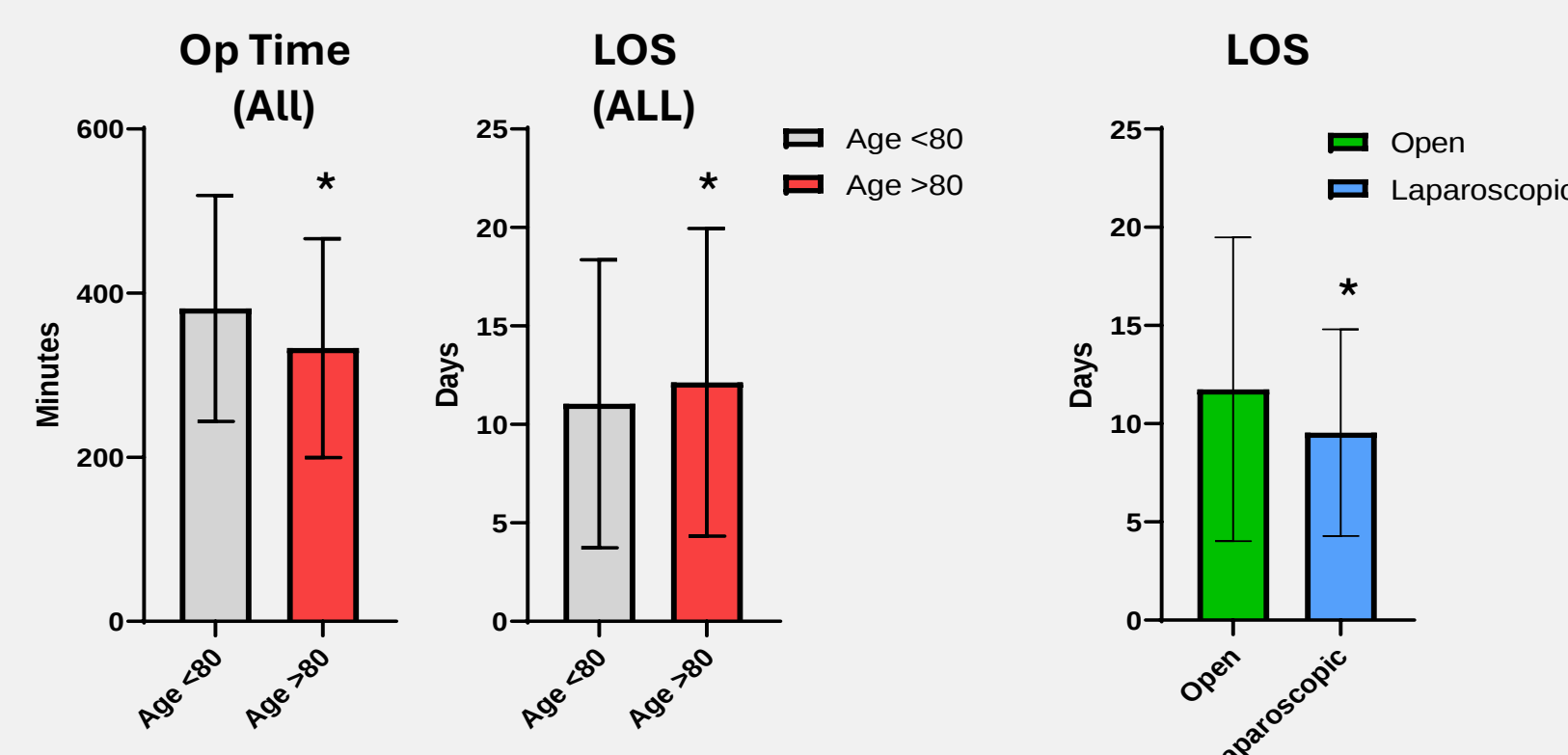
Methods

Data extracted from NSQIP dataset 2016-2023.

Inclusion criteria: Patients over age of 18 undergoing esophagectomy

Exclusion criteria: Patient who underwent esophagectomy without immediate reconstruction

Results



	Total (n)	Age <80 n (%)	Age >80 n (%)	p-value
Wound complications	1,865	1798 (16.71%)	67 (14.99%)	0.34
Pneumonia	1712	1633 (15.18%)	79 (17.67%)	0.1498
Septic shock	626	591 (5.49%)	35 (7.83%)	0.0348
Blood transfusion	1092	1033 (9.6%)	59 (13.2%)	0.012
VTE requiring therapy	276	255 (2.37%)	21 (4.7%)	0.0019
Intubation	1163	1097 (10.19%)	66 (14.77%)	0.0019
Re-operation	1804	1732 (16.09%)	72 (16.11%)	0.993
Re-admission	1258	1190 (11.06%)	68 (15.21%)	0.006
Anastomotic leak	1293	1234 (11.47%)	59 (13.20%)	0.261
30d mortality	344	320 (2.97%)	24 (5.37%)	0.004
Withdrawal of Care	117	106 (1.97%)	11 (4.55%)	0.006
Serious complications	4290	4085 (37.95%)	205 (45.86%)	0.001

Table 2. Clinical outcomes in patients above or below 80 y.o.

	30-day mortality		reoperation		readmission		serious complication		extended LOS		higher level of care		anastomotic leak	
	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value
Octogenarian	1.737(0.966-3.126)	0.065	0.937(0.681-1.287)	0.686	1.481(1.081-2.03)	0.015	1.362(1.082-1.715)	0.008	1.54(1.197-1.982)	0.001	2.568(1.832-3.6)	< 0.001	1.232(0.912-1.664)	0.173
Sex (female)	1.24(0.886-1.736)	0.210	0.98(0.842-1.141)	0.798	1.093(0.919-1.293)	0.313	1.044(0.929-1.173)	0.468	1.143(1.003-1.303)	0.045	1.059(0.872-1.286)	0.560	0.832(0.709-0.976)	0.024
BMI	1.012(0.899-1.138)	0.846	1.002(0.951-1.056)	0.937	1.03(0.97-1.093)	0.341	1.015(0.974-1.057)	0.484	0.916(0.873-0.96)	< 0.001	0.952(0.891-1.018)	0.147	1.072(1.017-1.129)	0.01
ASA 3+	2.984(1.568-5.681)	0.001	1.211(1.005-1.458)	0.044	1.037(0.842-1.276)	0.734	1.402(1.219-1.612)	< 0.001	1.51(1.277-1.786)	< 0.001	2.045(1.536-2.723)	< 0.001	1.255(1.036-1.520)	0.02
Diabetes	1.375(1.115-1.695)	0.003	1.168(1.053-1.295)	0.003	1.364(1.221-1.525)	< 0.001	1.244(1.145-1.351)	< 0.001	1.224(1.116-1.343)	< 0.001	1.243(1.094-1.413)	0.001	1.210(1.091-1.340)	< 0.001
Smoking history	1.418(1.036-1.941)	0.029	1.331(1.156-1.533)	< 0.001	1.024(0.863-1.214)	0.787	1.32(1.18-1.476)	< 0.001	1.278(1.127-1.45)	< 0.001	1.053(0.874-1.269)	0.584	1.28(1.107-1.48)	0.001
COPD	1.883(1.259-2.817)	0.002	1.206(0.97-1.499)	0.092	1.026(0.784-1.342)	0.853	1.644(1.377-1.963)	< 0.001	1.752(1.452-2.113)	< 0.001	1.679(1.301-2.168)	< 0.001	1.104(0.879-1.386)	0.395
CHF	2.374(1.068-5.277)	0.034	1.549(0.979-2.452)	0.061	0.973(0.538-1.763)	0.929	1.695(1.133-2.536)	0.010	1.83(1.198-2.795)	0.005	1.338(0.749-2.388)	0.325	1.203(0.741-1.953)	0.456

Table 3. Multivariate analysis of clinical factors associated with surgical outcomes.

	30-day mortality		reoperation		readmission		serious complication		extended LOS		higher level of care		anastomotic leak	
	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value
Operative Time	1.001(1-1.002)	0.044	1.001(1.001-1.002)	< 0.001	1.001(1-1.001)	0.012	1.001(1.001-1.002)	< 0.001	1.002(1.002-1.003)	< 0.001	1.001(1.001-1.002)	< 0.001	1.002(1.001-1.002)	< 0.001
Laparoscopic	0.703(0.484-1.022)	0.065	1.038(0.889-1.213)	0.636	1.172(0.983-1.396)	0.076	0.893(0.793-1.005)	0.060	0.564(0.491-0.648)	< 0.001	0.881(0.715-1.085)	0.233	1.174(1.005-1.371)	0.043
Robotic	0.749(0.407-1.378)	0.353	0.963(0.746-1.244)	0.775	0.922(0.685-1.24)	0.592	0.756(0.621-0.921)	0.005	0.425(0.335-0.54)	< 0.001	0.763(0.517-1.125)	0.171	0.937(0.725-1.211)	0.618
Transhiatal	1.242(0.85-1.816)	0.263	1.14(0.955-1.36)	0.146	0.991(0.805-1.218)	0.928	1.11(0.97-1.27)	0.131	1.047(0.896-1.223)	0.566	1.106(0.881-1.39)	0.384	1.186(0.992-1.418)	0.062
McKeown	0.972(0.664-1.423)	0.883	1.384(1.178-1.626)	< 0.001	1.083(0.891-1.315)	0.424	1.308(1.149-1.489)	< 0.001	1.028(0.89-1.187)	0.709	1.19(0.969-1.462)	0.097	1.296(1.103-1.524)	0.002

Table 4. Multivariate analysis of surgical approach and parameters associated with surgical outcomes.

Trend in Operative Approach

