The Dynamic Impact of Frailty on Surgical Outcomes: The Right Patient for the Right Procedure

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INTRODUCTION

•Optimal patient selection is critical to ensure high quality outcomes

•A measure of fitness for physiologic insult that may provide an objective appraisal for patient selection is frailty

•Frailty is defined as a decrease in physiologic reserve of multiple organ systems with identifiable altered physical function beyond that expected for normal aging

•There is no clear consensus on the optimal way to measure frailty

•A better understanding of the impact of frailty on the surgical patient is imperative

METHODS

•Retrospective study of the ACS-NSQIP Participant Use Files between 2005 to 2012

•Based Velanovich's modified frailty score, patients were classified as: non-frail (0), mildly frail (1), moderately frail (2) and severely frail (≥3)

•30-day outcomes were used as the primary end-point for this study

Velanovich's modified frailty score

Factor	Points
Functional health status before surgery	
Totally dependent	1
Metabolic	
Insuline dependent DM	1
Respiratory	
History of severe COPD or current pneumonia	1
Cardiovascular	
Congestive heart failure within 30 day of surgery	1
MI within 6 months of surgery	1
Previous PCI, cardiac surgery or angina within 1 month of surgery	1
HTN requiring medication	1
History of revasc/amputation for PVD or rest pain/gangrene	1
Neurologic	
History of TIA	1
CVA with deficit	1
Impaired sensorium	1

RESULTS

Mortality analysis for high-risk surgical procedures

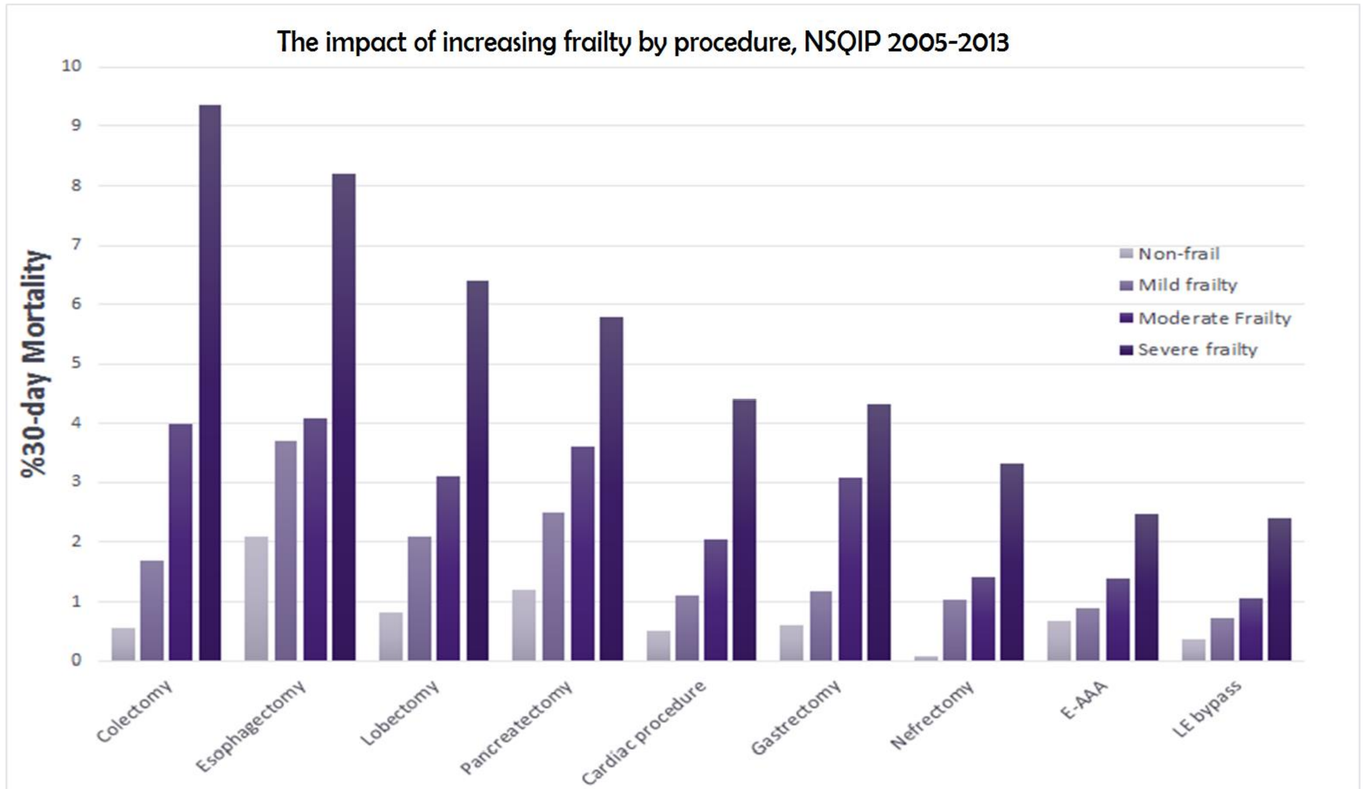
Factor	n(%), mean(SD)	p value	OR	p value
Age	72.17(11.4)	<0.0001		<0.0001
Gender		<0.0001		
Female	1687 (1.6)		1.16	<0.0001
Male	2309(1.8)		Referent	
Race		0.0191		
White	3091 (1.7)		Referent	
African American	410 (2.0)		1.35	<0.0001
Other	145 (1.8)		1.11	0.2307
Unknown	350 (1.7)		0.93	0.2374
Procedure		<0.0001		
Colectomy	1766 (1.8)		Referent	
LEB	811 (1.44)		0.32	<0.0001
Gastrectomy	224 (1.3)		1.15	0.0557
Endovascular AAA	207 (1.3)		0.32	<0.0001
Pancreatectomy	382 (2.3)		1.40	0.0015
Cardiac surgery	347 (2.6)		0.82	<0.0001
Nephrectomy	58 (0.8)		0.53	0.1063
Pulmonary resection	108 (2.6)		0.18	<0.0001
Frailty score		<0.0001		
0	441 (0.7)		Referent	
1	11766 (1.4)		1.65	<0.0001
2	1056 (2.1)		2.76	<0.0001
≥3	1323 (3.8)		6.01	<0.0001

Analysis of complication for high-risk surgical procedures

Factor	n(%), mean(SD)	p value	OR	p value
Age	65.6 (13.8)	<0.0001	0.99 (0.48)	<0.0001
Gender		<0.001		
Female	14,030 (13.2)		Referent	
Male	17,661(14)		1.01	0.3005
Race		<0.001		
White	23,969 (13)		Referent	
African american	3,615 (17.5)		1.53	<0.0001
Other	1027 (3.2)		0.97	0.43
Unknown	3080 (15)		1.14	<0.0001
Procedure		<0.0001		
Colectomy	11.860 (12.5)		Referent	
LEB	5,465 (9.7)		0.46	<0.0001
Gastrectomy	1,612 (9.3)		0.78	<0.0001
Endovascular AAA	1,299 (8.2)		0.44	<0.0001
Pancreatectomy	4,054 (24.3)		2.30	<0.0001
Cardiac surgery	4,769 (36)		3.02	<0.0001
Nephrectomy	1,027 (14.5)		1.22	<0.0001
Pulmonary resection	554(13)		0.96	<0.0001
Frailty score		<0.0001		
0	7,329 (10.8)		Referent	
1	10,209 (12.7)		1.18	<0.001
2	7271 (14.7)		1.63	<0.001
≥3	6,882 (19.5)		2.61	<0.001

Analysis of prolonged LOS for high-risk surgical procedures

Factor	n(%), mean(SD)	p value	OR	p value
Age	65.3 (14.1)	<0.0001	0.59	<0.0001
Gender		0.4		
Female	2010 (3.1)		Referent	
Male	2480 (3.1)		1.11	0.0004
Race		<0.001		
White	3215 (3)		Referent	
African american	628 (5.3)		1.90	<0.0001
Other	231 (4.1)		1.45	<0.0001
Unknown	416 (3.8)		1.44	<0.0001
Procedure		<0.0001		
Colectomy	2016 (3.5)		Referent	
LEB	791 (1.8)		0.27	<0.0001
Gastrectomy	349 (4)		1.21	0.0015
Endovascular AAA	82 (0.9)		0.16	<0.0001
Pancreatectomy	743 (7.2)		2.24	<0.0001
Cardiac surgery	365 (5.8)		1.12	0.0576
Nephrectomy	67 (2.17)		0.65	0.003
Pulmonary resection	49 (2.5)		0.63	0.0010
Frailty score		<0.0001		
0	1005 (2.5)		Referent	
1	1379 (2.9)		1.30	<0.001
2	938 (3)		1.87	<0.001
≥3	1151 (5)		4.09	<0.001



CONCLUSION

•Frailty is of increasing relevance for the surgeon as 25% of patients older than 65 years are frail

• Increases in mortality are procedure dependent and may not necessarily reflected procedure complexity

•Frailty is also linked to increasing complications and LOS, which suggests higher inpatient healthcare resource utilization