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Impact of AI-Driven Sarcopenia Assessment on Costs & Outcomes In Geriatric Oncology Surgery

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DISCLOSURES

- No financial interests or relationships to disclose

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BACKGROUND



Sarcopenia & Frailty:
common in older adults
undergoing abdominopelvic
cancer surgery and linked
to increased morbidity



Economic Impact: burden
of sarcopenia on resource
utilization and healthcare
costs is substantial, but not
well quantified

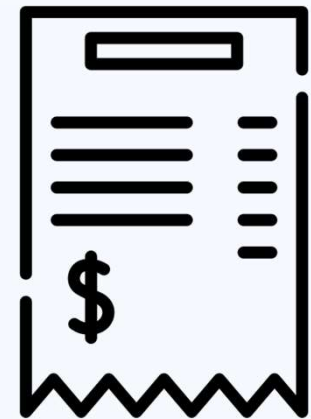
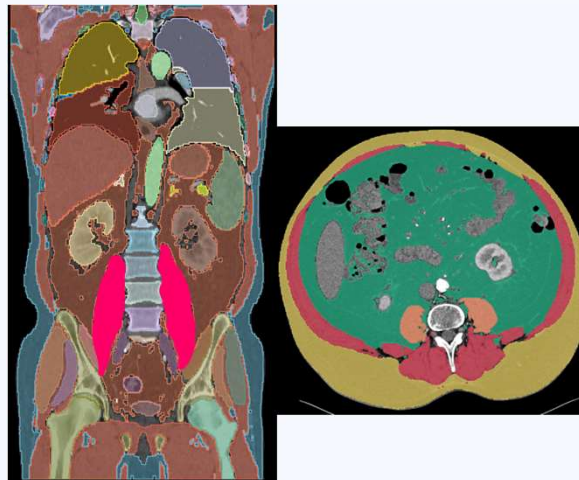
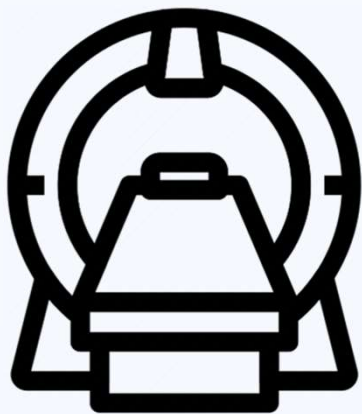


Research Gap: Limited
quantitative studies have
assessed the financial
impact of sarcopenia in
this surgical population

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AIM

Quantify the incremental hospitalization costs attributable to sarcopenia as assessed by a deep learning software tool that automates the measurement of skeletal muscle mass and quality volumetrically from routine preoperative CT images



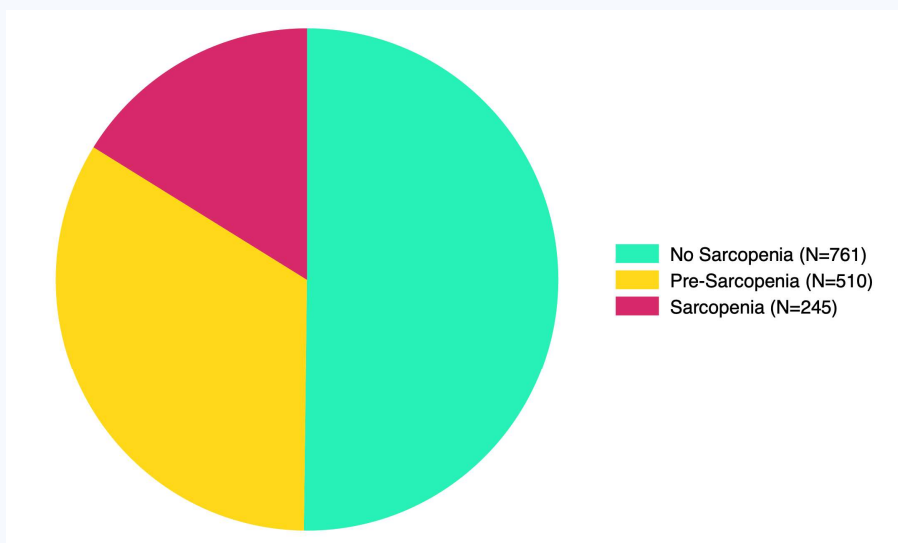
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METHODS

- **Study Design:** Retrospective cohort study using data from the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP)
- **Patient Selection:** Included patients undergoing abdominopelvic cancer surgery at the McGill-affiliated Jewish General Hospital (2017-2023)
- **Sarcopenia Assessment:** Using a 3-dimensional convolutional neural network segmentation model (coreslicer.com): AI-based analysis of preoperative CT scans to measure skeletal muscle volume and density
- **Cost Calculation:** Total hospitalization costs included hospital stay, OR/recovery room, procedures, equipment, nursing, pharmacy, and diagnostics (excluding physician fees)

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RESULTS: Baseline Data

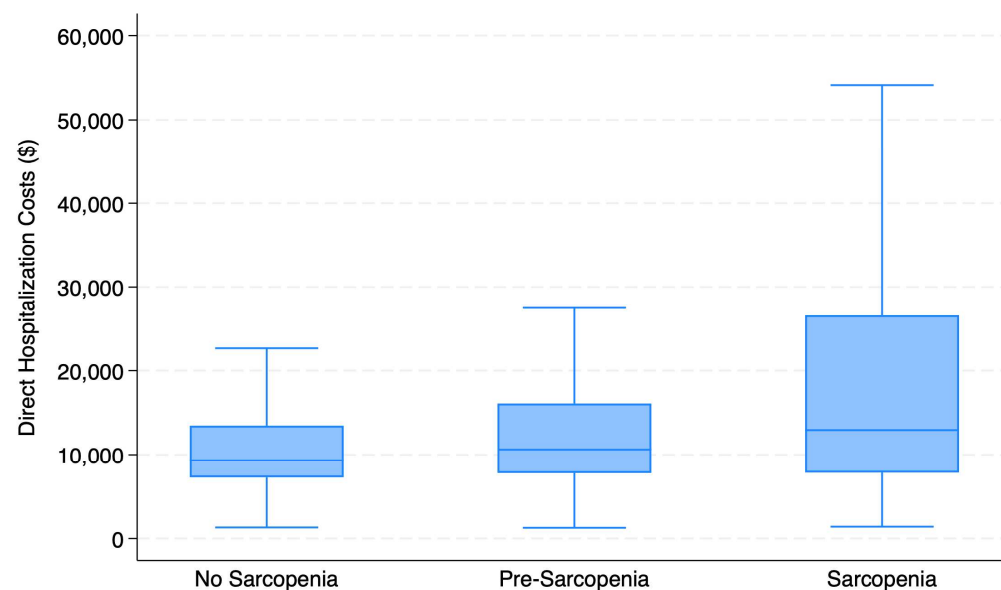


Variable	Total N=1516
Age at surgery (years)	67.0 (58.0-75.0)
Weight (kg)	74.0 (62.3-85.0)
Height (cm)	167.0 (160.0-174.0)
BMI	26.1 (23.0-29.7)
Female sex	750 (49%)
Cancer type:	
- Colorectal	85 (35%)
- Gastrointestinal	12 (5%)
- Genitourinary	49 (20%)
- Gynecological	30 (12%)
- Hepatobiliary	44 (18%)
- Pancreatic	25 (10%)
Psoas Muscle Area Index	165.0 (134.3-202.9)
Psoas Muscle Density	51.5 (45.9-56.1)
Total Costs (CAD)	10047.8 (7474.4-15744.1)

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RESULTS: Costs

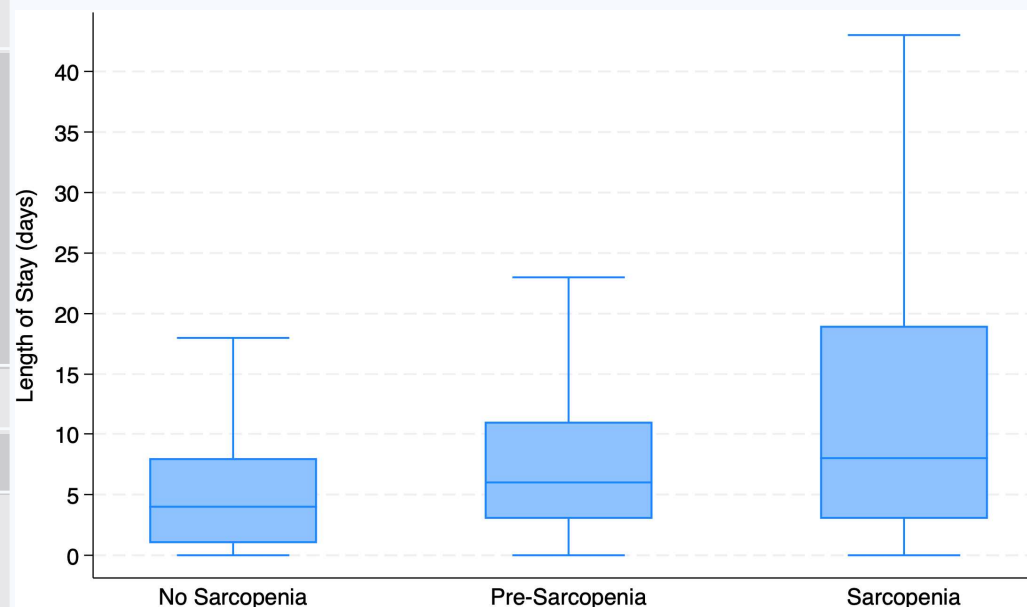
	Coefficient	95% CI	P-value
Age per 10 years	-1038.18	-2024.94, -51.42	0.04
Female Sex	-1558.88	-4073.32, 955.56	0.22
Cancer			
Colorectal	1	Referent	
Gastrointestinal	-579.07	-6479.77, 5321.64	0.85
Genitourinary	-6002.27	-9084.45, -2920.09	<0.001
Gynecological	-4487.49	-7940.91, -1034.07	0.01
Hepatobiliary	5461.59	1959.47, 8963.70	0.002
Pancreatic	6552.66	2059.37, 11045.95	0.004
ASA class	3597.42	1829.37, 5365.46	<0.001
Disability	18450.05	11109.43, 25790.66	<0.001
CT Muscle Status			
No Sarcopenia	1	Referent	
Pre-Sarcopenia	2455.74	-96.52, 5008.00	0.06
Sarcopenia	9482.52	6149.53, 12815.51	<0.001



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RESULTS: Length of Stay

	Coefficient	95% CI	P-value
Age per 10 years	-1.2	-2.06, -0.34	0.01
Female Sex	0.33	-1.87, 2.52	0.77
Cancer			
Colorectal	1	Referent	
Gastrointestinal	-0.33	-5.47, 4.81	0.90
Genitourinary	-8.24	-10.92, -5.55	<0.001
Gynecological	-7.45	-10.46, -4.44	<0.001
Hepatobiliary	-1.50	-4.56, 1.55	0.33
Pancreatic	3.07	-0.84, 6.99	0.12
ASA Class	4.55	3.00, 6.09	<0.001
Disability	21.05	14.65, 27.45	<0.001
CT Muscle Status			
No Sarcopenia	1	Referent	
Pre-Sarcopenia	3.79	1.56, 6.01	<0.001
Sarcopenia	9.13	6.22, 12.03	<0.001



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Results: Death & Serious Adverse Events

	Odds Ratio	95% CI	P-value
Age per 10 years	0.88	0.63, 1.24	0.47
Female Sex	0.79	0.36, 1.75	0.57
Cancer			
Colorectal	1	Referent	
Gastrointestinal	2.00	0.40, 9.97	0.40
Genitourinary	0.89	0.26, 3.07	0.85
Gynecological	0.26	0.03, 2.21	0.22
Hepatobiliary	2.74	1.03, 7.32	0.04
Pancreatic	2.36	0.68, 8.22	0.18
ASA Class	2.92	1.51, 5.68	<0.001
Disability	3.16	0.80, 12.49	0.10
CT Muscle Status			
No Sarcopenia	1	Referent	
Pre-Sarcopenia	4.97	1.60, 15.43	0.01
Sarcopenia	4.82	1.40, 16.64	0.01

Death

	Odds Ratio	95% CI	P-value
Age per 10 years	0.86	0.77, 0.97	0.02
Female Sex	0.87	0.65, 1.16	0.34
Cancer			
Colorectal	1	Referent	
Gastrointestinal	1.11	0.58, 2.12	0.75
Genitourinary	0.69	0.47, 1.01	0.06
Gynecological	0.37	0.22, 0.62	<0.001
Hepatobiliary	1.21	0.82, 1.77	0.34
Pancreatic	1.78	1.11, 2.84	0.02
ASA Class	1.77	1.42, 2.20	<0.001
Disability	1.60	0.74, 3.44	0.23
CT Muscle Status			
No Sarcopenia	1	Referent	
Pre-Sarcopenia	1.43	1.04, 1.95	0.03
Sarcopenia	2.46	1.70, 3.55	<0.001

Serious Adverse Events

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Conclusion & Take-Home Points

1. Pre-operative frailty and sarcopenia in abdominopelvic surgery patients can lead to excessive hospitalization costs and poor postoperative outcomes
2. Opportunistic assessment of sarcopenia using an automated deep-learning approach can identify this subset of frail patients
3. We can then target these identified frail patients with interventions such as prehabilitation to mitigate their risks

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