Objective

1. To determine whether the five-item modified frailty index (mFI-5) or the RAPT is more predictive of outcomes following THA and TKA

2. To compare both mFI-5 and RAPT to Charlson Comorbidity Index as a standard

Methods

Retrospective Single-Center Cohort Study

- Patients 50 and older undergoing primary elective THA or TKA by one of four surgeons

- Patients stratified for frailty severity using RAPT and mFI-5

- Bivariate analyses were conducted between groups followed by multivariate regression to control for confounders

- Youden's Index was utilized to generate ROC curves for each primary outcome

Primary Outcomes:

- Non-home discharge
- Prolonged LOS (1+ days)
- Complications
- Readmissions

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Methods

RAPT vs mFI-5

RAPT Score

- <6 (HIGH RISK): extended inpatient rehabilitation likely
- 6-9 (MODERATE RISK): may require additional intervention to discharge someone directly home
- >9 (LOW RISK): associated with direct home discharge

		Value	Score
1. What is your age group?		50-65 years 66-75 years >75 years	=2 =1 =0
2. Gender?		Male Female	=2 =1
3. How far on average can you walk? (a block is 200 metres)		Two blocks or more (+/-rest) 1-2 blocks (+/-rest) Housebound (most of time)	=2 =1 =0
4. Which gait aid do you use? (more often than not)		None Single-point stick Crutches/frame	=2 =1 =0
5. Do you use community supports? (home help, meals on wheels, district nursing)		None or one per week Two or more per week	=1 =0
6. Will you live with someone who can care for you after your operation?		Yes No	=3 =0
Your score (out of 12)			

mFI-5

- 0-1: NOT FRAIL
- 2-3: PRE-FRAIL
- 4-5: FRAIL

Variable (1 point each)
• Dementia • Acute heart failure within 30 days of surgery • Pneumonia within 30 days of surgery or chronic pulmonary disease • Partially/fully dependent functional status • Diabetes

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Results

DEMOGRAPHICS

- 364 THA and 494 TKA patients
- Among frailty groups:
  - 547 (63.8%) not frail
  - 273 (31.8%) pre-frail
  - 38 (4.4%) frail
- Among RAPT groups:
  - 369 (43.0%) RAPT >9 (low risk),
  - 402 (46.9%) RAPT 6-9 (moderate risk)
  - 87 (10.1%) RAPT <6 (high risk).

OUTCOMES

- Higher mFI-5:
  - Longer LOS (3.53 days vs. pre-frail: 2.05 days vs. not frail: 1.58 days, p<0.001)
  - More non-home discharge (43.2% vs. pre-frail: 14.7% vs. not frail: 4.02%, p<0.001)

- Lower RAPT:
  - Longer LOS (2.76 vs. RAPT 6-9: 1.96 vs. RAPT >9: 1.44 days, p<0.001)
  - More non-home discharge (37.2% vs. RAPT 6-9: 9.95% vs. RAPT >9: 1.63%, p<0.001)

Results

Multivariable Logistic Regression

Variables	Non-Home Discharge		Readmission		Complication		Prolonged Length of Stay	
	Odds Ratio	P-value	Odds Ratio	P-value	Odds Ratio	P-value	Odds Ratio	P-value
mFI								
Pre-Frail	2.31	**0.006***	1.58	0.141	0.83	0.400	2.41	**<0.001***
Frail	8.82	**<0.001***	0.83	0.807	1.63	0.248	1.89	**0.001***
RAPT								
Moderate	4.87	**0.001***	1.08	0.821	1.17	0.502	1.97	**<0.001***
Severe	27.2	**<0.001***	0.43	0.170	1.08	0.830	4.87	**<0.001***
CCI	1.23	**<0.001***	1.20	**<0.001***	1.18	**<0.001***	1.27	**<0.001***
Male Sex	1.69	0.107	0.26	0.001	1.07	0.747	0.76	0.118
BMI	1.01	0.593	1.01	0.835	1.06	**0.001***	1.07	**<0.001***
THA (ref: TKA)	1.18	0.555	1.14	0.661	1.28	0.220	0.53	**<0.001***

Results

Receiver Operating Characteristic Curves

Variable	AUC	95% CI	Sensitivity	Specificity
Any Complication				
RAPT	0.535	0.487 – 0.583	0.629	0.441
mFI-5	0.525	0.478 – 0.571	0.394	0.643
CCI	0.645	0.594 – 0.695	0.621	0.595
90-Day Readmission				
RAPT	0.554	0.488 – 0.619	0.698	0.439
mFI-5	0.574	0.504 – 0.643	0.509	0.647
CCI	0.619	0.539 – 0.698	0.623	0.574
Non-Home Discharge				
RAPT	0.772	0.725 – 0.819	0.923	0.466
mFI-5	0.720	0.662 – 0.777	0.718	0.674
CCI	0.729	0.677 – 0.782	0.769	0.596
Prolonged LOS				
RAPT	0.656	0.623 – 0.689	0.718	0.552
mFI-5	0.649	0.617 – 0.681	0.522	0.769
CCI	0.671	0.635 – 0.706	0.584	0.682

Conclusions

- mFI-5 performs similarly to RAPT in predicting prolonged length of stay and post-hospital discharge

- Neither mFI-5 nor RAPT are independently associated with complications or readmissions, but CCI remains independently associated with each

- mFI-5 can be a useful addition in the pre-operative care pathway in appropriate risk stratification for THA and TKA patients