

Development of a Pre-Operative Risk Assessment Calculator for Periprosthetic Joint Infection within One-Year of THA

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BACKGROUND

- Periprosthetic joint infection (PJI) is a devastating complication after total hip arthroplasty (THA).
- Identification of high-risk patients is necessary to mitigate risk.

PURPOSE

- To develop a risk prediction model for PJI within 1-year of THA.

METHODS

- Patients who underwent unilateral, elective THA for primary osteoarthritis, inflammatory arthritis, or post-traumatic arthritis between 2015-2019 were identified within the PearlDiver database.
- Exclusion Criteria:
 - Conversion THA
 - THA for fracture, septic arthritis, or bone neoplasia
 - Follow up < 1-yr
- Bivariate analyses identified differences in patient specific and surgical characteristics between patients who underwent revision THA for PJI within 1-year and a random control group of patients that did not.
- Statistically significant factors were then incorporated into a multivariable regression model
- β -coefficients were used to generate a composite score representing the probability of PJI at 90-days and 1-year.

Table 1. Patient characteristics included in multivariable regression

	PJI (n = 1,455)	No PJI (n = 208,980)		PJI (n = 1,455)	No PJI (n = 208,980)
Mean Age (yrs.)	64 ± 10	66 ± 10	Comorbidities:		
Male (%)	709 (48.7)	89,615 (42.9)	Arrhythmias	535 (36.7)	60,780 (29.1)
Indication for Surgery (%)			Blood Loss Anemia	186 (12.8)	10,455 (5.0)
Primary Osteoarthritis	1,273 (87.5)	191,782 (91.8)	Coronary Artery Disease	485 (33.3)	60,125 (28.8)
Avascular Necrosis	44 (3.0)	3,648 (1.7)	CHF	121 (8.3)	11,236 (5.4)
Inflammatory Arthritis	138 (9.5)	13,550 (6.5)	Coagulopathy	247 (17.0)	21,070 (10.1)
BMI Classification (kg/m ²)			COPD	620 (42.6)	67,530 (32.3)
Underweight (≤ 18.5) *	31 (2.1)	3,920 (1.9)	Deficiency Anemia	466 (32.0)	36,130 (17.3)
Normal Weight (18.5 - 24.9)	82 (5.6)	15,768 (7.5)	Deep Vein Thrombosis	91 (6.3)	6,968 (3.3)
Overweight (25.0 – 29.9) *	246 (16.9)	34,772 (16.6)	Diabetes Mellitus		
Obese (≥ 30)	1,096 (75.4)	9,0224 (21.5)	with Complications	408 (28.0)	36,746 (17.6)
Social History:			without Complications	562 (38.6)	58,412 (28.0)
Alcohol Abuse	182 (12.5)	15,321 (7.3)	Fluid Electrolyte Disorders	776 (53.3)	66,318 (31.7)
Drug Abuse	267 (18.4)	18,389 (8.8)	Liver Disease	337 (23.2)	34,105 (16.3)
Tobacco Use	415 (28.5)	43,119 (20.6)			
* No significant difference					
BMI; Body Mass Classification, CHF; Congestive Heart Failure, COPD; Chronic Obstructive Pulmonary Disease					

RESULTS

- 210,435 patients were included in this study
 - Risk factors found to be significant factors for PJI and were included in multivariable regression model (Table 1)
 - The areas under the curves were 0.864 (Fig 1) and 0.862 (Fig 2) at 90-days and 1-year, respectively
 - This model was superior to models based on Charlson Comorbidity Index (CCI) and Elixhauser Comorbidity Index (ECI).
- ## DISCUSSION
- We created a weighted composite score to predict patient's risk of PJI within one-year of primary, unilateral THA.
 - The model provides useful insights for surgeons seeking to mitigate the risk of PJI in THA patients.

Fig 1. Receiver operating characteristics (ROC) curves for predictive models for PJI within 90-days of THA

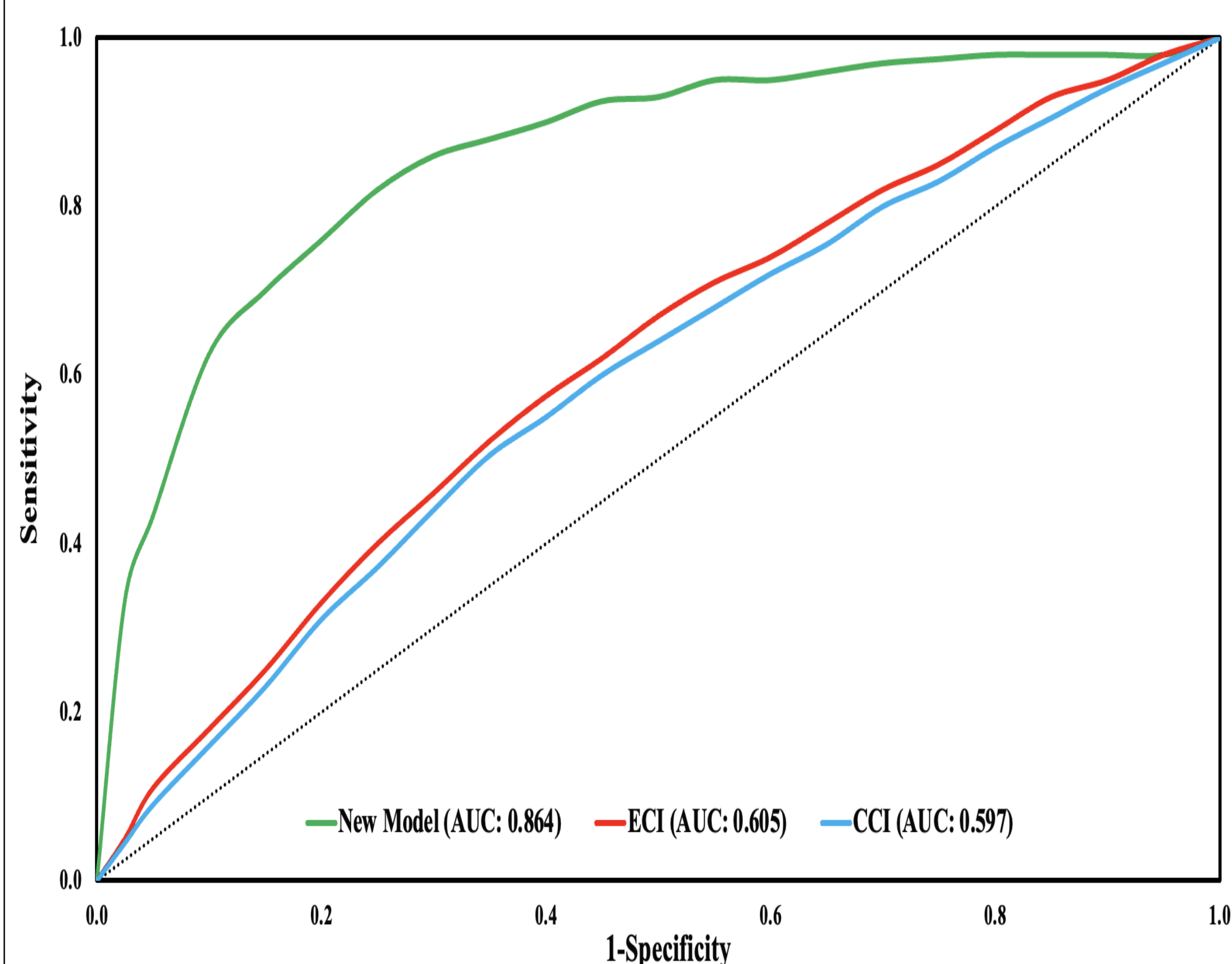


Fig 2. Receiver operating characteristics (ROC) curves for predictive models for PJI within 1-year of THA

