3-2014

A Clinical Decision Support Tool to Predict the Risk of Failure in Patients with Femoroacetabular Impingement Undergoing Hip Preservation Surgery

Claudio Diaz-Ledezma, MD
Rothman Institute of Orthopaedics at Thomas Jefferson University Hospital

Mitchell Maltenfort, PhD
Rothman Institute of Orthopaedics at Thomas Jefferson University Hospital

Lesley Walinchus, BS
Rothman Institute of Orthopaedics at Thomas Jefferson University Hospital

Benjamin Hendy, BS
Rothman Institute of Orthopaedics at Thomas Jefferson University Hospital

Thomas Novack, BS
Rothman Institute of Orthopaedics at Thomas Jefferson University Hospital

Follow this and additional works at: https://jdc.jefferson.edu/rothinsposters

Part of the Orthopedics Commons

Let us know how access to this document benefits you

See next page for additional authors

Authors

Claudio Diaz-Ledezma, MD; Mitchell Maltenfort, PhD; Lesley Walinchus, BS; Benjamin Hendy, BS; Thomas Novack, BS; and Javad Parvizi, MD, FRCS

A Clinical Decision Support Tool to Predict the Risk of Failure in Patients with Femoroacetabular Impingement Undergoing Hip Preservation Surgery

Claudio Diaz-Ledezma MD, Mitchell Maltenfort PhD, Lesley Walinchus BS, Benjamin Hendy BS, Thomas Novack BS, Javad Parvizi MD, FRCS.

Investigation performed at the Rothman Institute of Orthopaedics at Thomas Jefferson University Hospital, Philadelphia, PA.

INTRODUCTION

In modern orthopaedics, risk prediction scores can help discriminate between ideal and poor candidates for a specific therapeutic intervention. We consider these tools useful during the process of shared medical decision-making[1]. To our knowledge, such a strategy has never been explored in the field of hip preservation surgery.

The aim of our study is to generate a clinical decision support tool to predict risk of failure after hip preservation surgery among patients with femoroacetabular impingement (FAI).

MATERIALS AND METHODS

Data from 269 patients with clinical and radiological diagnosis of FAI (as evaluated by two independent observers) and no evidence of radiographic osteoarthritis were analyzed (Table 1). At a mean follow-up of 1.9 years after mini-open femoroacetabular osteoplasty[2] (6 months to 6.6 years), we categorized the outcome of surgery as success [modified Harris hip score (HHS) >80 and patient satisfaction], or failure (modified HHS <80, conversion to total hip arthroplasty (THA), or revision hip-preserving procedures). A regression analysis model including 23 preoperative variables (Table 2) was used to identify the independent predictors of failure (p<0.05), which were then combined to produce a risk prediction score that generates case-specific guidance during shared decision-making.

RESULTS

Data revealed that 172 patients were considered successful (65.2%) and 92 (34.8%) were considered to have failed. Age, body mass index, characteristics of hip pain (intermittent versus constant), duration of symptoms (less or more than 12 months), and the use of any walking assistance were predictors of failure in our logistic regression model. A scoring system for predicting the occurrence of failure combining these 5 variables was created, which was able to stratify the risk of failure into a range from 10% to 80% (Tables 3, 4). The goodness of fit of our predictive score was evaluated using C-statistics, presenting a value of 0.729.

TABLES 1 - 3

	Mean ± SD // N (%)
Age (years)	34 ± 11
BMI (kg/m^2)	25.5 ± 4.6
Males	155 (58.7%)
Obesity (BMI > 30) (kg/m^2)	40 (15%)
Preoperative modified Harris hip score	55.2 ± 16.8
Preoperative UCLA	5.8 ± 2.6
Months of pain	10 ± 3

Table 1. Study sample. SD=Standard deviation; N=Number; BMI=Body mass index; kg=Kilogram; m^2=Square meters; UCLA=University of California Los Angeles.

Variables	
Age	Question 7 in HHS
BMI	Question 8 in HHS
Obesity	MRI report with the diagnosis of OA
Preoperative HHS	Workers Compensation
Preoperative UCLA	Psiquiatric pathology (current or precedent)
Months of pain	Previous orthopaedic trauma
Question 1 in HHS	Previous minor trauma
Question 2 in HHS	Characteristics of pain
Question 3 in HHS	Age>27.55
Question 4 in HHS	More than 12 months of symptoms
Question 5 in HHS	Previous hip surgery
Question 6 in HHS	

Table 2. Variables included in the model. HHS=Harris hip score; BMI=Body mass index; OA=Ostheoarthritis; UCLA=University of California Los Angeles.

Age points		BMI points		Pain characteristics	Points
15	0	15	0	Constant	25
20	10	20	10	Intermittent	0
25	20	25	20		
30	30	30	30	Pain >12 months	Points
35	40	35	39	FALSE	0
40	50	40	49	TRUE	17
45	60	45	59		
50	70	50	69	Use of walking assistance device	Points
55	80			None	0
60	90			Yes	32
65	100				

Table 3. Scoring system. BMI=Body mass index.

DISCUSSION

Because of its reasonable predictive capacities, our scoring system can be helpful in assessing individual risks of failure during the short and mid-term among patients with FAI undergoing hip preservation surgery. Consequently, it can be applicable during the process of preoperative shared medical decision-making in the fast-growing field of orthopaedics. We believe that the usefulness of our tool relies on its simplicity and anamnestic nature.

TABLE 4

Total points	Probability of failure
47	0.1
82	0.2
106	0.3
125	0.4
142	0.5
160	0.6
179	0.7
203	0.8

Table 4. Probability of failure according the score.

REFERENCES

1. Dolan JG. Shared decision-making--transferring research into practice: the Analytic Hierarchy Process (AHP). *Patient Educ Couns*. 2008;73(3):418–425.
2. Cohen SB, Huang R, Ciccotti MG, Dodson CC, Parvizi J. Treatment of femoroacetabular impingement in athletes using a mini-direct anterior approach. *Am J Sports Med*. 2012;40(7):1620–1627.