Does Fellowship Training Influence the Complications Following Primary, Conversion, and Revision Total Hip Arthroplasty Procedures: American Board of Orthopedics (ABOS) Analysis

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INTRODUCTION:

The projected demand for total hip arthroplasty (THA) continues to rise. Although most orthopedic surgeons opt for sub-specialization fellowship training, the growing demand for arthroplasty surgery is expected to outpace the supply of the fellowship-trained arthroplasty surgeon workforce. Studies have shown that among orthopaedic specialties, adult reconstruction (AR) surgeons performed about 2/3rd of all joint arthroplasty procedures, the lowest percent within all orthopedic subspecialty performing within their area of subspecialty training. Consequently, orthopaedic surgeons with either no or non-adult reconstruction formal fellowship training often have to perform a substantial proportion of THAs. The purpose of this study was to evaluate and compare the trends in complications and perioperative course following primary, conversion and revision THA stratified by fellowship training.

METHODS:

The American Board of Orthopaedic Surgery (ABOS) Part II database was queried from 2003 to 2017. All primary (pTHA), conversion (cTHA), and revision (rTHA) THA were identified by standard Current Procedural Terminology codes and stratified based on the type of fellowship training (No fellowship (NF), AR (adult reconstruction), Other (non-AR), and dual Fellowship (DF: AR + non-AR). Patient demographics, 90-day medical and surgical complications, as well as readmission and reoperation were collected. Univariate and multivariate logistic regression models determined the impact of fellowship training on the rates of these outcomes.

RESULTS:

A total of 35,773 pTHA, 1,868 cTHA and 5,989 rTHA were evaluated. Of these, 64.4%,72.7%, 75.1%, and were performed by AR trained surgeons respectively. (Figure 1) There was no significant difference in rate of medical complications by fellowship type. The overall surgical complication rate was 11.9% (4,263/35,773), 21.0% (392/1,868), and 23.5% (1,407/5,989) following pTHA, cTHA, and rTHA, respectively. Multivariable logistic regression analyses demonstrated that when compared to AR fellowship trained surgeons, DF, NF, and 'Other' fellowship reported a respective 1.13 (p=0.091), 1.14 (p=0.004), and 1.35 (p<0.001) times increased odds of surgical complications following pTHA. Furthermore, Other fellowship had 28% (p=0.020) increased odds of surgical complications following rTHA when compared to AR. (Table1) NF training compared to AR training was associated with a 1.39 (p=0.013) and 2.75 (p=0.037) increased odds of reoperation among pTHA and cTHA, respectively.

DISCUSSION AND CONCLUSION:

Although majority of all the THAs are done by AR surgeons, about 1/3rd are still done by non-AR surgeons. Among surgeons taking the ABOS Boards Part II, Other non-AR fellowship training was associated with an increased risk of pTHA surgical complications compared to AR fellowship trained orthopedic surgeons. Furthermore, reoperation rates among p THA and cTHA cases were higher among no fellowship training compared to AR fellowship training. No statistical significance was observed among fellowship training and rTHA outcomes, which may be attributed to case selection bias.

Table 1: THA-Overall Surgical and Medical Complications

THA SURGICAL COMPLICATIONS						
	Univariate Analysis			Multivariable Analysis		
Independent variable	**OR**	**95% CI**	**P-value**	**OR**	**95% CI**	**P-value**
Year Group						
2003-2006	REF	REF	-	REF	REF	-
2007-2010	1.09	0.99-1.22	0.077	1.11	1.00-1.24	0.045
2011-2014	1.19	1.07-1.31	0.001	1.23	1.11-1.36	<0.001
2015-2017	1.37	1.24-1.51	<0.001	1.43	1.29-1.57	<0.001
Age (years)						
≤60	REF	REF	-	REF	REF	-
61-72	1.01	0.94-1.10	0.786	0.97	0.90-1.05	0.407
73-82	1.10	1.01-1.20	0.029	1.06	0.97-1.16	0.232
≥83	1.22	1.06-1.40	0.005	1.16	1.01-1.33	0.035
Fellowship Group						
Other	REF	REF	-	REF	REF	-
AR	0.84	0.79-0.90	<0.001	0.81	0.76-0.87	<0.001
AR+Other	0.92	0.76-1.10	0.348	0.86	0.72-1.03	0.108
Sex						
Female	REF	REF	-	REF	REF	-
Male	0.76	0.71-0.81	<0.001	0.76	0.71-0.82	<0.001
THA MEDICAL COMPLICATIONS						
	Univariate Analysis			Multivariable Analysis		
Independent variable	**OR**	**95% CI**	**P-value**	**OR**	**95% CI**	**P-value**
Year Group						
2003-2006	REF	REF	-	REF	REF	-
2007-2010	0.98	0.86-1.12	0.741	1.03	0.90-1.17	0.703
2011-2014	1.73	1.54-1.95	<0.001	1.85	1.64-2.08	<0.001
2015-2017	2.11	1.89-2.37	<0.001	2.27	2.02-2.56	<0.001
Age (years)						
≤60	REF	REF	-	REF	REF	-
61-72	1.49	1.36-1.64	<0.001	1.48	1.35-1.63	<0.001
73-82	2.22	2.01-2.46	<0.001	2.35	2.13-2.60	<0.001
≥83	3.10	2.70-3.54	<0.001	3.32	2.89-3.82	<0.001
Fellowship Group						
Other	REF	REF	-	REF	REF	-
AR	1.09	1.002-1.18	0.045	1.01	0.93-1.10	0.895
AR+Other	0.94	0.75-1.16	0.546	0.79	0.64-0.99	0.041
Sex						
Female	REF	REF	-	REF	REF	-
Male	1.02	0.95-1.10	0.619	1.14	1.06-1.23	<0.001

Table 1. Univariable and multivariable logistic regression evaluating independent risk factors associated with postoperative Surgical and Medical Postoperative Complications among primary THA patients. THA = Total Hip Arthroplasty; REF= Reference; CI = Confidence Interval; AR = Adult Reconstruction; P <0.05 is considered statistically significant.

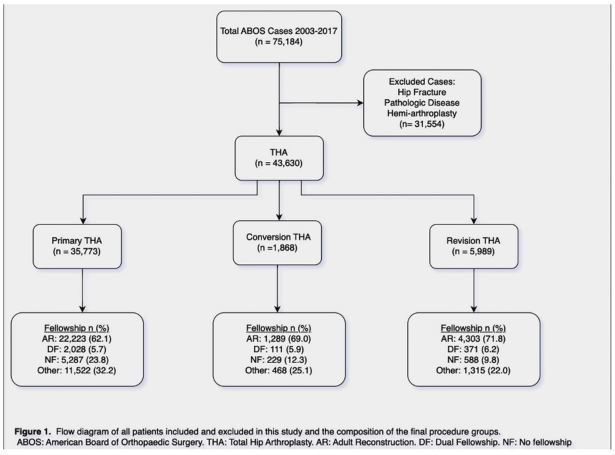

Figure 1. Flow diagram of all patients included and excluded in this study and the composition of the final procedure groups. ABOS: American Board of Orthopaedic Surgery. THA: Total Hip Arthroplasty. AR: Adult Reconstruction. DF: Dual Fellowship. NF: No fellowship