Complications, Length of Stay, Mortality, and Readmission Rates After Total Knee Arthroplasty.

A Study of 22,656 Patients.

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No Disclosures

Introduction

- Osteoarthritis is a common cause of joint pain and functional disability
- Leading cause of disability among older adults in the United States
- Between 1999 and 2008 utilization of TKR surgery more than doubled in the United States
- The demand for TKR surgery has been predicted to increase by as much as 673% by 2030

Purpose

- Determine if increasing patient age in primary TKR leads to more:
  - Postoperative complications
  - Length of hospital stay
  - Hospital readmissions
  - Mortality

Materials and Methods

- Retrospective. 22,656 patients
- Patients selected from the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) 2012 by CPT code for primary TKR
- Patients grouped according to age and stratified by decade
- Patient demographics and medical history were recorded.

Materials and Methods

- Outcome measures within the 30 day post operative period were recorded for each age group. These included:
  - Postoperative complications
  - Length of hospital stay
  - Hospital readmissions
  - Mortality

Results

- 22,656 patients status post primary TKR. Included 8,423 males and 14,233 females

Decade	Avg Age	# Pts	Total Male	Total Female
20 - 29	25.7	22	10	12
30 - 39	35.7	78	30	48
40 - 49	46.2	710	253	457
50 - 59	55.5	4310	1607	2703
60 - 69	64.7	8328	3179	5149
70 - 79	74.0	6567	2394	4173
80 - 89	83	2532	906	1626
90+	90+	109	44	65

Results

- Demographics:
  - BMI
    - Highest in 40 – 49 yr olds
    - Lowest in 90+ yr olds
  - Smokers
    - Highest in 30 – 39 yr olds
    - Lowest in 90+ yr olds
  - Comorbidities
    - Highest in 80 – 89 yr olds
    - Lowest in 20 – 29 yr olds

Decade	Avg BMI	% Smokers	Avg Comorbidities per Patient
20 - 29	30	13.6%	0.36
30 - 39	35	33.3%	0.53
40 - 49	36	24.1%	0.57
50 - 59	35	15.9%	0.82
60 - 69	34	7.8%	0.97
70 - 79	32	4.3%	1.11
80 - 89	32	1.9%	1.13
90+	26	0.0%	1.02

Results

- Average Length of Hospital Stay
  - *Ranged* from 3.10 – 4.41 days (All ages)
  - *Shortest* stay 30 – 39 year olds, 3.10 days (p =1.00)
  - *Longest* stay 20 – 29 year olds, 4.41 days (p =1.00)

Decade	Avg Length of Stay (Days)
20 - 29	4.41
30 - 39	3.10
40 - 49	4.00
50 - 59	3.22
60 - 69	3.22
70 - 79	3.40
80 - 89	3.95
90+	4.11

Results

- Post operative complications
  - *Highest* complication rate in 20 – 29 yr olds, 9.09% (p > 0.20)
  - *Lowest* complication rate in 30 – 39 yr olds, 2.56% (p > 0.20)

Decade	% Post OP Comp
20 - 29	9.09%
30 - 39	2.56%
40 - 49	3.80%
50 - 59	3.36%
60 - 69	3.64%
70 - 79	4.90%
80 - 89	6.48%
90+	5.50%


Results

- Most Common post operative complication per age group
  - 20 – 29 year olds – wound dehiscence
  - 30 – 39 year olds – deep wound infection and pneumonia
  - 40 – 49 year olds – DVT
  - 50 – 59 year olds – DVT
  - 60 – 69 year olds – UTI
  - 70 – 79 year olds – UTI
  - 80 – 89 year olds – UTI
  - 90+ year olds – UTI

Results

- Each complication reported as highest incidence by decade follows:
  - *Superficial wound infections* : the 90+ year olds (0.92%)
  - *Deep wound infection* : 30 – 39 year olds (1.28%)
  - *Wound dehiscence* : 20 – 29 year olds (9.09%)
  - *UTI* : 80 – 89 year olds (2.01%)
  - *Pneumonia* : 30 – 39 year olds (1.28%)
  - *Reintubation* : 70 – 79 year olds (0.29%)
  - *PE* : 70 – 79 year olds (0.94%)
  - *Failure to wean off of ventilator* : 40 – 49 year olds (0.14%)
  - *Renal insufficiency* : 40 – 49 year olds (0.42%)
  - *CVA* : 80 – 89 year olds (0.16%)
  - *Coma* : 70 – 79 year olds (0.02%)
  - *Neurological deficit* : 60 – 69 year olds (0.01%)
  - *Cardiac arrest* : 70 – 79 year olds (0.15%)
  - *MI* : 90+ year olds (0.92 %)
  - *DVT* : 40 – 49 year olds (1.41%)
  - *Sepsis* : the 90+ year olds (0.92%)
  - *Septic shock* : 80 – 89 year olds (0.24%)

Results

- Readmission Rates
  - *Highest* in patients aged 90+ years, 9.17% ($p = 0.02$ compared to patients aged 40 – 79)
  - *Lowest* in 50 – 59 year olds, 2.97% ($p < 0.002$ compared to patients aged 70 – 90+)

Decade	% Readmission
20 - 29	4.55%
30 - 39	7.69%
40 - 49	3.80%
50 - 59	2.97%
60 - 69	3.11%
70 - 79	4.10%
80 - 89	6.04%
90+	9.17%

Results

- Mortality
  - *Highest* in patients aged 40 – 49 years old (0.14%)
  - *Lowest* in patients aged 20 – 29, 30 – 39, and 90+ year olds (0%)
  - No patients aged 90+ perished in the first 30 days postoperatively

Decade	30 day Mortality
20 - 29	0.00%
30 - 39	0.00%
40 - 49	0.14%
50 - 59	0.05%
60 - 69	0.04%
70 - 79	0.05%
80 - 89	0.08%
90+	0.0%

Results

Decade	Avg Length of Stay (Days)	% Post OP Comp	30 day Mortality	% Readmission
20 - 29	4.41	9.09%	0.00%	4.55%
30 - 39	3.10	2.56%	0.00%	7.69%
40 - 49	4.00	3.80%	0.14%	3.80%
50 - 59	3.22	3.36%	0.05%	2.97%
60 - 69	3.22	3.64%	0.04%	3.11%
70 - 79	3.40	4.90%	0.05%	4.10%
80 - 89	3.95	6.48%	0.08%	6.04%
90+	4.11	5.50%	0.0%	9.17%

Discussion

- Complications
  - Postoperative complication rates were *similar* between patients aged 40 – 69 and in patients > 69 years old
  - *Highest* in the 20 – 29 year old patients
    - Cohort only had 22 patients
    - Wide spectrum of diagnoses including: Malignant Neoplasm, Post-Traumatic Arthropathy, Rheumatoid Arthritis, Pathologic Fracture, and Osteonecrosis

Discussion

- Length of Stay
  - *Longest* in 20 – 29 year olds; again only had 22 patients and wide spectrum of Dx
  - *Shortest* in 30 – 39 year olds
    - Also had lowest postoperative complication rate and a 0% mortality rate
    - Also had the most smokers and the 2nd highest average BMI

Discussion

- Readmission Rate
  - The 90+ age group had the *highest* readmission rate
  - The 90+ age group was most frequently discharged to a rehab or skilled care center
    - All other age groups were most frequently discharged home

Discussion

- Mortality
  - *None* of the patients 90+ years old died in the acute post-op period
    - Small number of patients (109)
    - Careful patient selection prior to surgery may have introduced selection bias
  - *Highest* mortality rate was in the 40 – 49 year olds
    - Highest average BMI
    - 2nd highest percentage of smokers

Conclusions

- Primary TKR can be performed safely in appropriately selected elderly patients, including patients greater than 90 years old
- Postoperative complications can occur in any age group
- Postoperative complications, length of hospital stay, hospital readmission, and mortality rates do not increase linearly with advancing patient age