Long-term Mortality Outcomes in TKA Patients Under Age 60

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Disclosure of Conflict of Interest

- We have no conflict of interest for this study

Introduction

- Number of total knee arthroplasty (TKA) being performed in patients under age 60 is on the rise.

(Kurtz et al., 2009, CORR)

- However, there is lack of consensus over long-term effect of TKA over mortality of patients under age 60.

- Swedish registrar study reported that TKA in patients < 55:
  - Decreased mortality within the first decade
  - But, increased mortality after 10 years

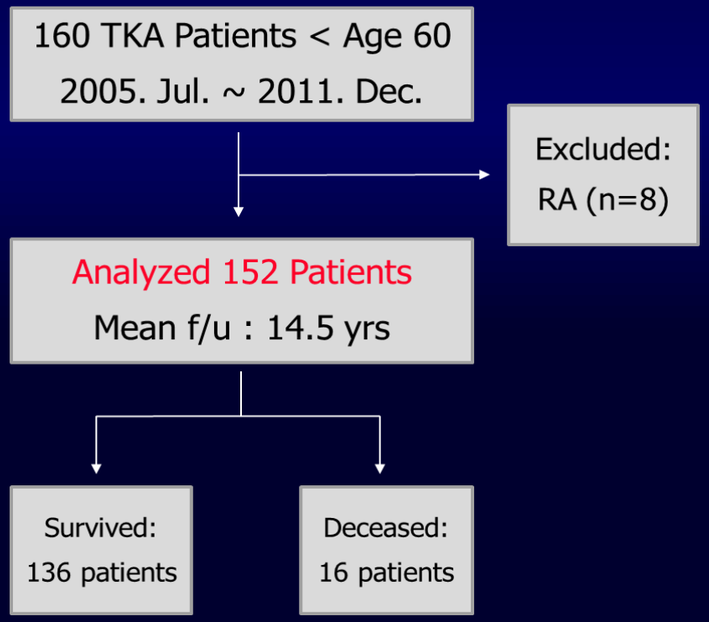
(Robertsson et al., 2007, JBJS)

Study Purposes

- To compare the mortality rates between TKA patients and the Korean population who are under age 60
- To analyze the preoperative conditions of the deceased patients and the causes of death
- To investigate long-term implant survival outcomes in minimum 12-year follow-up

Study Cohort

- 160 TKA Pts. retrospectively analyzed
  - Seoul National Univ. Bundang Hospital, Republic of Korea
  - 2 senior surgeons
- 152 Patients were included



Summary of Cohort (n=152)

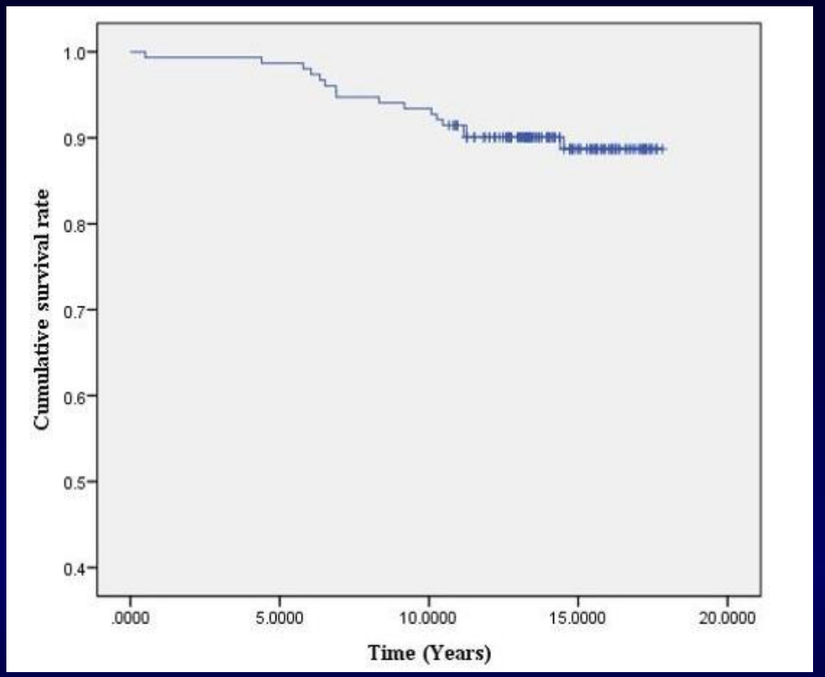
Variables	Mean±S.D.	95% CI	
		Lower	Upper
Age at the time of the operation	**55.8±3.8**	55.16	56.39
Follow-up period (year)	**14.5±1.9**	14.21	14.83
BMI	28.6±3.9	27.94	29.18
Charlson Comorbidity Index	1.5±1.0	1.29	1.61
Gender	n	%	
Male	17	11.1	
Female	135	88.9	
Smoking	n	%	
Yes	19	12.5	
No	133	87.5	

Clinical Evaluation

- Demographics: gender, age, height, weight, BMI
- Clinical parameters: preop. medical conditions, smoking, revision rate, Charlson Comorbidity Index (CCI)
- Death records: The Korea National Statistical Office (KNSO)
- Standardized Mortality Ratios (SMR) calculated using person-years approach:
  - Obsrvd. deaths / Expctd. death = SMR
- Expected deaths calculated with Indirect age-adjustment method
  - Death rate of Korean standard population x person–years of cohort

Long-term Mortality

Long-term Mortality of TKA Pts. < 60 (n=152)			
Variables	Mean±S.D.	95% CI	
		Lower	Upper
Survival period (year)	13.81±2.87	13.35	14.27
Status			
Alive	**136**	**89.5%**	
Death	**16**	**10.5%**	



- Mortality at ≥ 12Y follow up : 10.5% (16/152, 10.5%)
- 73% of deaths (13/16) occurred within first post-op decade
- 1 death (“external reason”) occurred within first post-op year

Age & Sex Adjusted Mortality

❖ **Sex & Age-specific SMR for Male Pts.**

Age group(years)	Total Pts.	Person-years	Obsrvd. deaths	SMR (95% CI)
40 to 49	3	39.65	1	**11.11 (0.55-54.8)**

❖ **Sex & Age-specific SMR for Female Pts.**

Age group(years)	Total Pts.	Person-years	Obsrvd. deaths	SMR (95% CI)
30 to 39	1	0.00	0	**0.00**
40 to 49	5	64.38	1	**16.67 (0.83-82.2)**
50 to 59	135	1808.05	14	**4.26 (2.42-6.97)****
Total (30 to 59)	141	1872.43	15	**7.11 (4.13-11.46) ****

$* p < 0.05$, $** p < 0.001$

- Mortality of under 60 female Pts. > General population
- Mortality of 50 - 59 female Pts. > General population

Deceased Group vs. Alive Group

		Deceased (n=16)	Alive (n=136)	p-value
Age		54.38	55.94	.602
BMI		27.25	28.72	.357
Sex	**Male**	1 (6.2%)	16 (11.8%)	.164
	Female	15 (93.8%)	120 (88.2%)	
Laterality	**Rt. Only**	5 (31.2%)	35 (25.7%)	.435
	Lt. Only	6 (37.5%)	43 (31.6%)	
	Staged or Simul.	5 (31.2%)	58 (42.6%)	
Diagnosis	**Primary OA**	14 (87.5%)	118 (86.8%)	.869
	Secondary OA	2 (12.5%)	18 (13.2%)	
Revision surgery	**Yes**	1 (6.2%)	5 (3.7%)	.331
	No	15 (93.8%)	131 (96.3%)	
Smoking	**Yes**	5 (31.2%)	14 (10.3%)	**<.005***
	No	11 (68.8%)	122 (89.7%)	
Charlson Comorbidity Index		2.38	1.35	**<0.05***

- Deceased group had higher smoking rate and CCI.

Cause of Death

❖ **Cause-specific SMR for Female TKA Pts. < 60**

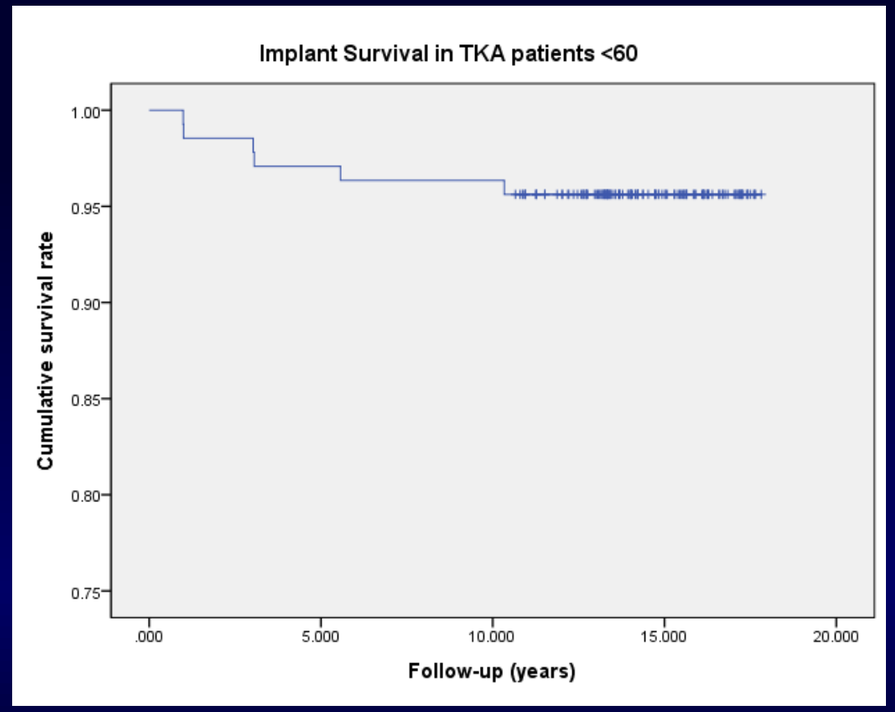
Cause of death, n (%)	Obs (%)	Exp	SMR	95% CI
Infectious and parasitic ds.	0 (0)	0.07	0.00	
Neoplasms	5 (31.3)	1.76	2.85	1.0-6.30*
Endocrine	2 (12.5)	0.10	20.48	3.4-66.1*
Mental and behavioral disorders	0 (0)	0.02	0.00	
Nervous system ds.	0 (0)	0.07	0.00	
Circulatory system ds.	3 (18.8)	0.42	7.12	1.8-19.4*
Respiratory system ds.	1 (6.3)	0.08	12.29	0.6-61.6
Digestive system ds.	0 (0)	0.14	0.00	
Genitourinary system ds.	2 (12.5)	0.06	31.60	5.6-110.1*
Injury, poisoning and external causes	1 (6.3)	0.45	2.21	0.1-11.0
Others	1 (12.5)	0.10	9.54	0.5-49.3
All of death	15 (100)	3.31	5.39	2.6-7.3***

Note: Other causes include codes with R00-R99 and an observed number of deaths equal to zero.
* $p < 0.05$, *** $p < 0.001$.

- Neoplasm, Endocrine, Circulatory system ds., and Genitourinary system ds. stood out as cause of death

Implant Survival in TKA Pts. < 60

❖ Implant survival in TKA Pts. < 60 (n=152)		
Revision surgery	n	%
No	146	96.1%
Yes	**6**	**3.9%**
Reasons of revision		
Aseptic Loosening	0	0
Infection	3	50%
Periprosthetic Fracture	3	50%



- 3.9% (6/152) of <60 TKA patients underwent revision
- None of revision was due to aseptic loosening or insert wear

Conclusions

- In our cohort, the long-term mortality rate in <60 TKA patients was 10.5%, which was higher compared to general population.
- 73% of deaths occurred within first post-op decade.
- Deceased group had higher smoking rate and CCI.
- Neoplasm, Endo, CV ds., and GU ds. were causes of deaths.
- No patient required revision surgery for aseptic loosening or insert wear in our cohort.
- Continuous surveillance and management of overall health is necessary for a younger patient with severe primary knee OA.

References

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