Using Bootstrapping to Evaluate LOS Median Differences between Two Knee Arthroplasty Procedures

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ABSTRACT

• Knee arthroplasty is an effective treatment for end-stage gonarthrosis.

• Two Knee arthroplasties:
  - Total knee arthroplasty (TKA) & Unicompartmental knee arthroplasty (UKA)
  - TKA is common, while UKA is new emerged alternative procedure for select patients

• The purpose is to use a large, heterogeneous national database to compare median differences in length of stay (LOS) between these two procedures
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METHODS

• Data Collection
  29,328 patients undergoing primary knee arthroplasty from 2005 to 2011 were identified from the ACS NSQIP using CPT code 27447 for TKA and 27446 for UKA.
  Of these, TKA 27,740 (94.6%) and UKA 1588 (5.41%)

METHODS-cont.

• Initial LOS Comparison via proc npar1way
  Result: 3 days for TKA and 2 days for UKA, p<0.0001

• To reduce selection bias, a propensity score model was created. From there a propensity score matched dataset was used to make another comparison to have same result.

• To estimate the precision of the median difference through resampling technique bootstrap, SAS procedure PROC SURVEYSELECT was used to create bootstrapped samples.

```sas
proc surveyselect data=aa method=urs rep=1000 out=bootstrap seed=30459584;
  method=urs /* specify the type of random sampling */
  samprate=1 /* get a sample of the same size as our original data set */
  outhits /* give the times a record chosen */
  rep=1000; /* specify the number of bootstrap samples that we want */
strata cases;
run;
```
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METHODS-cont.

- From these bootstrapped samples, other PROCs were employed to generate their LOS median differences

/*Step 1*/
proc sort data=bootstrap;
   by replicate cases;
run;
/*Step 2*/
proc means data=bootstrap noprint nway median;
   by replicate cases;
   var tothlos; /*length of stay (LOS)*/
   freq numberhits;
   output out=results median=medianx;
run;

/*Step 3- transpose and get median differences*/
proc transpose data=results(keep=replicate cases medianx) out = t_results
   prefix=grp_; by replicate;
   var medianx;
   id cases;
run;

/*Step 4-Finally, their 95% confidence interval (CI) */
proc univariate data=median_diff noprint;
   var median_diff;
   output out=percentiles pctlpre=P_ pctlpts= 2.5, 97.5;
run;
proc print;
run;
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RESULTS

• The result did not include 0 inside the interval. Therefore, now we have 95% confidence that their medians are different with UKA patient having a short duration stay at hospital.

• Similar comparisons can be made by the current methodologies.

REFERENCES


  http://www.listserv.uga.edu/cgi-bin/wa?S2=sas-l&D=0&H=0&O=T&T=1&q=Median+bootstrap&s=&f=&a=&b=
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