Incidence of Acute Kidney Injury in the Patients Undergoing Surgical TAVI

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Disclosure of potential conflict of interest

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Background

- Acute kidney injury (AKI) is a complication of angiography
- It accounts for a prolonged hospital stay and worse in-hospital outcome

P. A. McCullough, "Contrast-Induced Acute Kidney Injury," *Journal of the American College of Cardiology*, vol. 51, no. 15, pp. 1419–1428, 2008

- AKI has been shown to be an independent predictor of mortality

B. H¨olscher, C. Heitmeyer, M. Fobker, G. Breithardt, R. M. Schaefer, and H. Reinecke, "Predictors for contrast mediainduced nephropathy and long-term survival: prospectively assessed data fromthe randomized controlled Dialysis-Versus- Diuresis (DVD) trial," *Canadian Journal of Cardiology*, vol. 24, no. 11, pp. 845–850, 2008.

- TAVI requires the administration of contrast media, and in TAVI population , preexisting kidney disease is frequent
- The incidence of AKI, predictors of this complication, and its impact on outcome have so far been poorly defined

Objectives

To evaluate the incidence, predictive factors and prognosis of AKI following Surgical TAVI

Surgical TAVI Patients

- Since June 2010 , 52 pts. underwent surgical TAVI :
  - **Trans Apical** : 42 (81%)
  - **Trans Axillary** : 6 (11%)
  - **Trans Aortic** : 4 (8%)

Baseline data and periprocedural characteristics, Surgial TAVI

	Total n =52
Gender(Male), n (%)	20(40%)
Age, mean ±s.d., years	81±8
Hypertension, n (%)	46(88%)
Hypercholesterolemia, n (%)	45(87%)
Diabetes, n (%)	24(46%)
Peripheral occlusive disease, n (%)	17(33%)
Coronary heart disease, n (%)	28(54%)
Previous myocardial infarction, n (%)	12(23%)
Previous CABG, n (%)	10(19%)
Previous stroke, n (%)	10(19%)
Baseline creatinine, mean ± s.d., µmol/L	1.3±0.5
GFR, mean ± s.d., mL/min/1,73m2	52±18
Baseline Hemoglobin, mean ± s.d., mmol/L	12.4±1.5
EUROScore STANDART, mean ±s.d.	10±3
EUROScore LOGISTIC, mean ±s.d.	21±16

All values are expressed as mean ±s.d. or *n* (%).

Early Results

- 30 Day Mortality : 4/52 (8%)
- Technical Success : 51 (98%)
  - Conversion to Open Surgery : 1 (2%)
- Major complications :
  - CVA : 2(4%)
  - Sepsis : 7(14%)
  - Pacemaker : 4(8%)
  - Re-Open : 7 (14%)
- Length Of Stay : 13 ±10 days

Patients & Methods

- Retrospective study, 49 pts.
- None suffered from end stage renal disease
- **Renal function** at baseline and after 72 hours was determined from serum creatinine
- *Definition of Acute Kidney Injury* :
  - According to Valve Academic Research Consortium (**VARC) -**modified RIFLE classification
  - Defined as stage 2 or 3 :
    - Increase in serum creatinine to 200%-300% of baseline

    or

    - Increase of serum creatinine of 26.4-354 mmol/L (0.3-4.0 mg/dL)

Results

Baseline data and periprocedural characteristics with respect to different access modes for valve replacemen

	Without AKI n =25	With AKI n =24	Total n =49	P value
Gender (Male) , n (%)	6(24%)	13(54%)	19(39%)	0.042
Age, mean ±s.d., years	80±8	81±9	81±8	0.496
Hypertension, n (%)	20(80%)	23(96%)	43(88%)	0.189
Hypercholesterolemia, n (%)	21(84%)	22(92%)	43(88%)	0.667
Diabetes, n (%)	11(44%)	12(50%)	23(47%)	0.778
Peripheral occlusive disease, n (%)	4(16%)	12(50%)	16(33%)	0.016
Coronary heart disease, n (%)	13(52%)	13(54%)	26(53%)	1.000
Previous myocardial infarction, n (%)	5(20%)	6(25%)	11(22%)	0.742
Previous CABG, n (%)	5(20%)	3(12%)	8(16%)	0.702
Previous stroke, n (%)	4(16%)	6(25%)	10(20%)	0.496
Pc mean ± s.d	1.2±2.4	2.2±3.1	1.7±2.8	0.210
Baseline creatinine, mean ± s.d., µmol/L	1.2±0.4	1.3±0.5	1.3±0.5	0.420
GFR, mean ± s.d., mL/min/1,73m2	53±18	53±19	52±18	0.935
Baseline hemoglobin, mean ± s.d., mmol/L	12.2±1.2	12.6±1.8	12.4±1.5	0.432
Hemoglobin Max after intervention, mean ± s.d., mmol/L	9.3±1.1	8.7±1.2	9.0±1.2	0.069
EUROScore STANDART, mean ±s.d.	9±3	11±2	10±3	0.035
EUROScore LOGISTIC, mean ±s.d.	16±10	24±16	21±16	0.058
Weight (kg) ±s.d.	65±15	72±13	68±14	0.115
Height (cm) ±s.d.	160±8	162±9	161±9	0.422

All values are expressed as mean ±s.d. or *n* (%).

Results (cont)

Multivariate predictors of acute kidney injury.

	OR	CI 95%	*P* value
Gender (Male)	2.930	0.675-12.723	0.15
Peripheral occlusive disease	3.522	0.766-16.190	0.11
EUROScore STANDART	1.357	0.991-1.857	0.05

Early Results

	Without AKI n =25	With AKI n =24	**P Value**
Mortality	0(0%)	4(17%)	0.050
CVA	0(0%)	2(8%)	0.235
SEPSIS	0(0%)	7(29%)	0.004
Pacemaker	2(8%)	2(8%)	1.000
ReOpen	3(12%)	4(17%)	0.702
Length Of Stay	9±5	17±13	0.011

All values are expressed as mean ±s.d. or *n* (%).

Renal Guard

- Closed loop system
- Create & maintain high urine output “at risk” period for CIN :
  - Prevent contrast agents from clogging tubules
  - Limit toxin exposure in kidneys
- Minimizing the risk of over/under-hydration

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Conclusions

- Development of AKI is frequent (49%) in patients undergoing Surgical TAVI
- AKI is correlated with higher morbidity and mortality compared to pts w/o AKI after surgical TAVI
- Male gender, PVD, higher EuroScore are risk factors for AKI
- Higher EuroScore predicted AKI
- Further investigation of reno-protective interventions is necessary to optimize the treatment of these patients

Thank you