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## Burden of Periprosthetic Joint Infection and its Treatment on Kidney Function

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## INTRODUCTION

Patients with periprosthetic joint infection (PJI) are subjected to several potentially nephrotoxic conditions such as acute and chronic systemic inflammatory reactions, multiple surgical procedures and noxious antibiotics. This study aims to investigate 1) the incidence and severity of kidney injury in patients undergoing surgical treatment for PJI, 2) whether the number of surgeries affects renal function in PJI patients and 3) the potential risk factors for kidney injury.

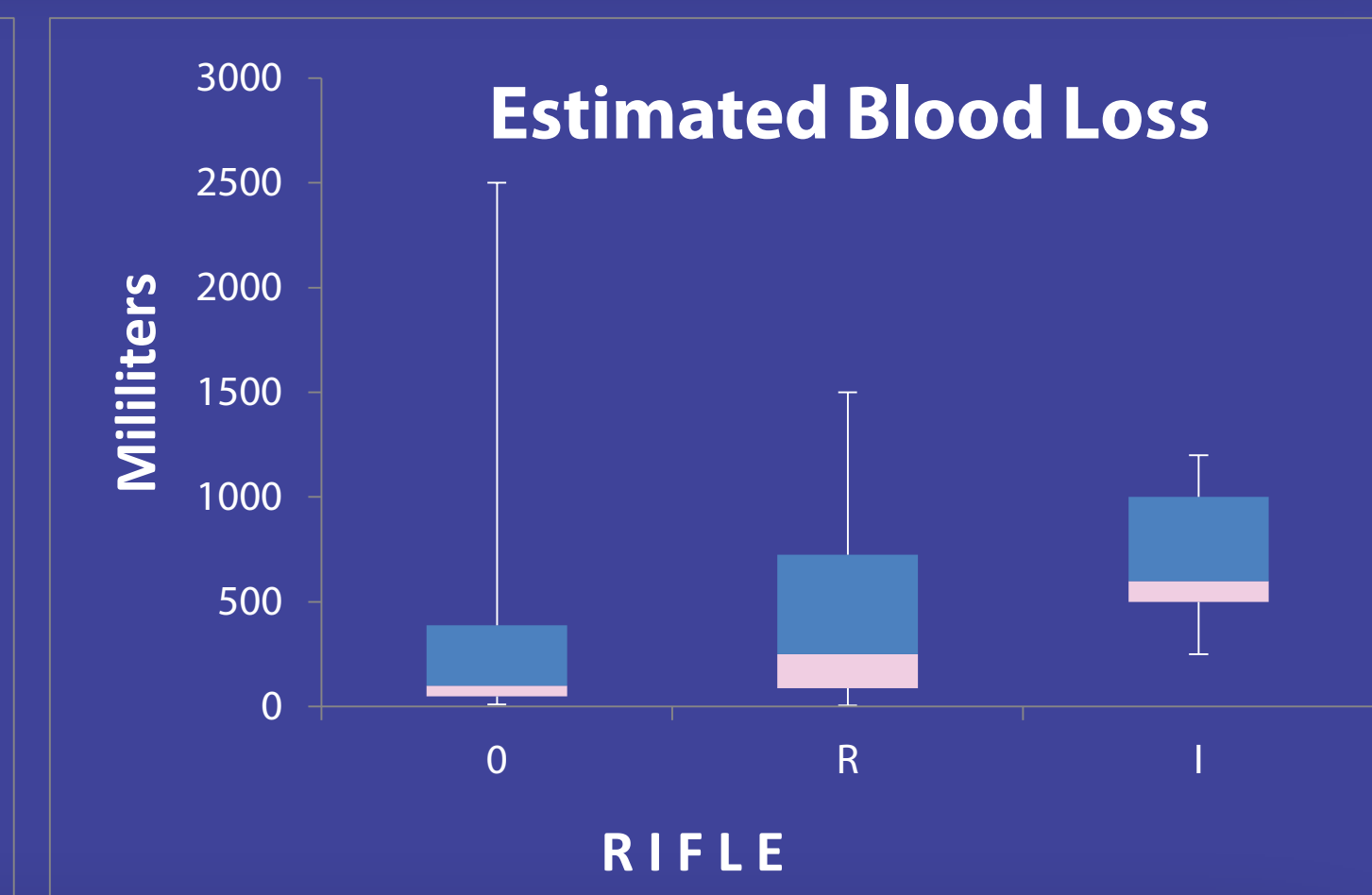
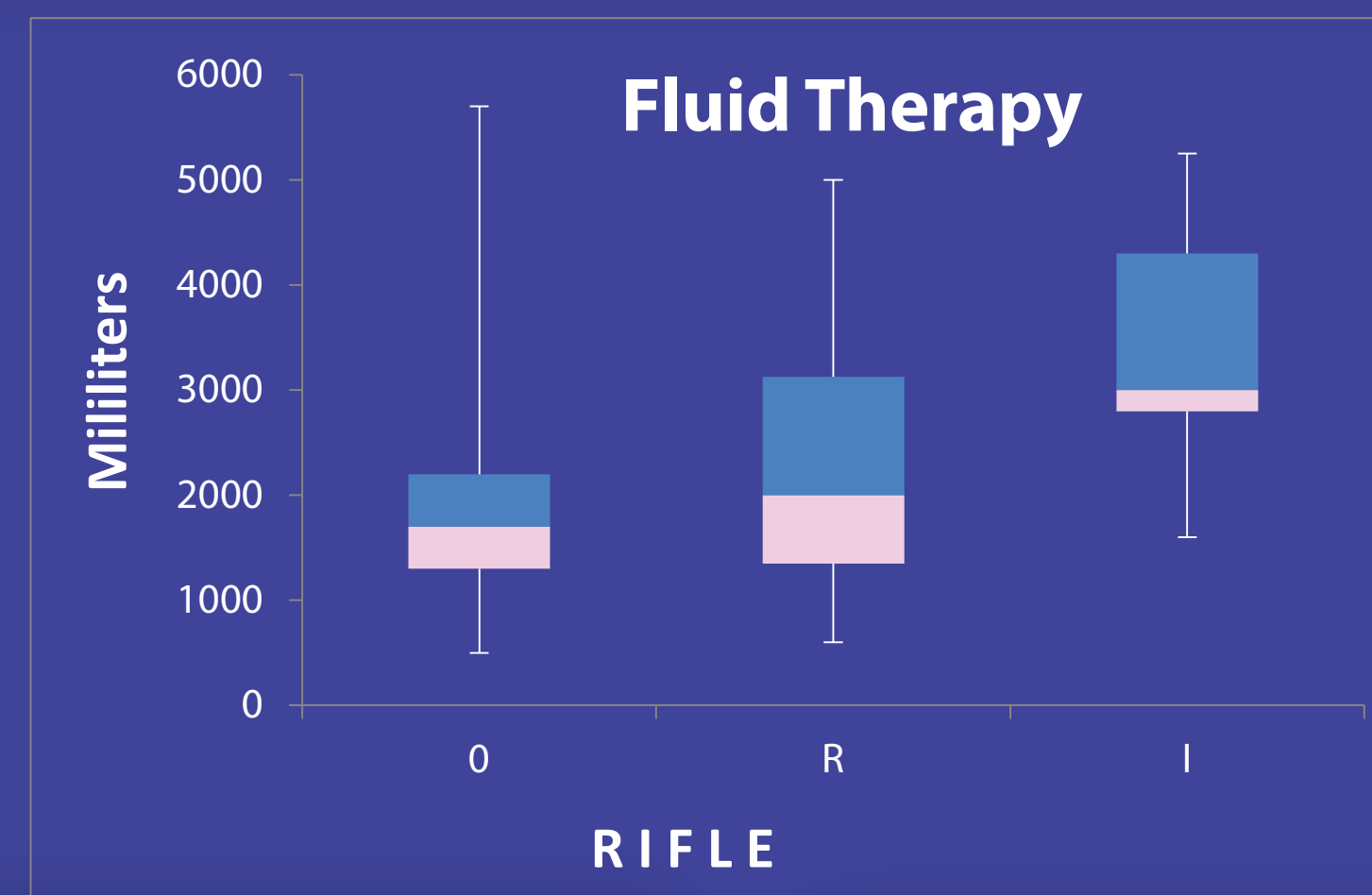
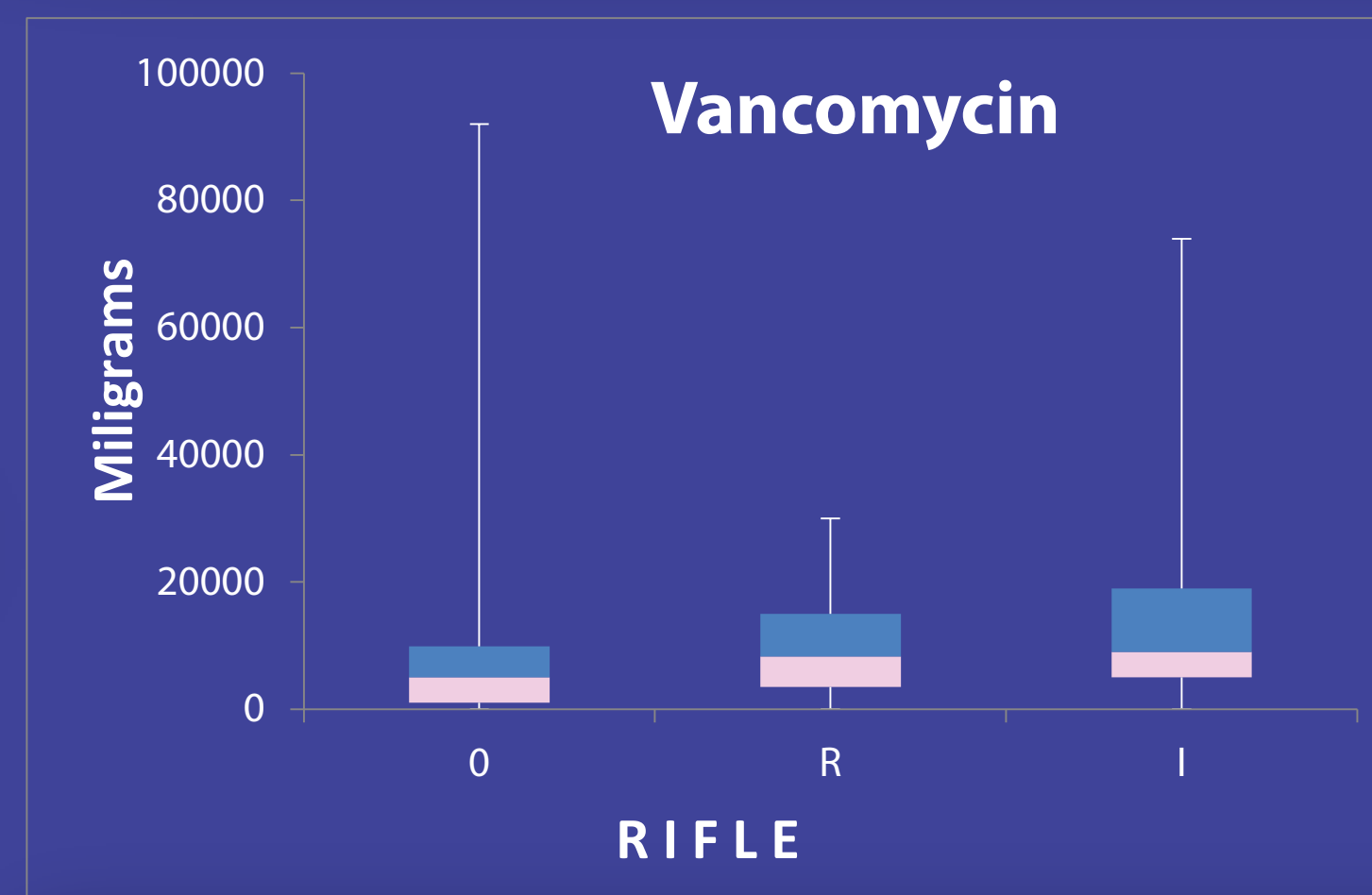
## MATERIALS AND METHODS

We retrospectively collected data on 3185 consecutive patients who underwent revision arthroplasty due to PJI (282) or aseptic (2903) failure during 2000-2011. Baseline and postoperative serum creatinine (Cr) levels were used to define kidney injury, based on the RIFLE (Risk, Injury, Failure, Loss and End-stage kidney disease) criteria and clinically important minimum rise in serum Cr level ( $>0.3$  mg/dl)<sup>1</sup>. Patients with preexisting renal disease (baseline Cr level  $>1.2$  mg/dl) were excluded. PJI was defined using criteria recently proposed by International Consensus Group on PJI<sup>2</sup>.

## RESULTS

Based on the mean of the three highest creatinine values, the incidence of kidney injury in PJI and aseptic groups was 26% (72/282) and 7% (98/2903), respectively ( $p < 0.001$ ). The distribution of RIFLE criteria is demonstrated in the table 1. Based on the final post-treatment Cr values, the incidence of clinically important minimum rise in Cr level was significantly higher in PJI group (65/282, 23%) compared to aseptic group (153/2903, 5%;  $p < 0.001$ ). There was weak trend for the influence of number of surgeries on the incidence of post-treatment residual kidney injury (Spearman's rho = 0.13,  $p = 0.03$ ). In multivariate analysis, accumulative intravenous vancomycin dosage ( $p < 0.01$ ), intraoperative volume repletion ( $p = 0.049$ ), and estimated blood loss ( $p = 0.08$ ) were associated with RIFLE classification (Figures 1-3). The demographic factors, Charlson comorbidity index, use of spacer, duration of surgery, perioperative anemia, transfusion, anticoagulation method and implant type (cemented versus non-cemented) did not have any association.

## FIGURES 1, 2 & 3



### TABLE 1

	PJI	Aseptic
<b>NO kidney damage</b>	210	2805
<b>Risk</b> Serum Cr $> \times 1.5$ baseline Cr	39	79
<b>Injury</b> Serum Cr $> \times 2$ baseline Cr	21	17
<b>Failure</b> Serum Cr $> \times 3$ baseline Cr	10	2
<b>Loss</b> Complete loss of function $> 4$ weeks	2	0
<b>End-stage</b> End-stage kidney disease $> 3$ months	0	0
<b>Total</b>	282	2903

Table 1. Distribution of kidney injury as defined by the RIFLE criteria in PJI and aseptic groups. PJI=Periprosthetic joint infection; Cr=Creatinine.

## DISCUSSION

The risk of sustaining clinically significant kidney injury in patients with PJI who undergo revision surgery is increased compared with patients undergoing aseptic revision arthroplasty. This difference does not seem to be fully explained by the increased number of surgical procedures in PJI patients. Increased need for intraoperative volume repletion due to blood loss and intravenous vancomycin administration are significant risk factors for acute kidney injury following septic revision surgery. Recognition of potential risk factors for such adverse effect should lead to implementation of appropriate nephron-protective strategies, such as adequate intraoperative hydration and meticulous adjustment of postoperative vancomycin dosage, in PJI patients.

## REFERENCES

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