

## **PJI-TNM as new classification system for periprosthetic joint infections & An evaluation of 20 cases including inter- and intraobserver variability**

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### **INTRODUCTION:**

Current classifications for periprosthetic joint infections (PJIs) often fail in detailed description of the overall underlying patient situation. The PJI-TNM classification uses the principles of the TNM classification from oncology for description of critical parameters in PJIs: affected joint, type of implant and implant stability, soft tissue conditions, maturity of biofilm formation, causative microorganism, comorbidities of the patient and recurrence of infection. The aim of the current work is to evaluate the feasibility of this new PJI-TNM classification in clinical practice. Furthermore, intraobserver and interobserver reliability were analyzed.

### **METHODS:**

The PJI-TNM classification was used in 20 patients with hip, knee and shoulder PJIs. Based on retrospective chart review, the respective parameters T (tissue and implants), N (non-eukaryotic cells and fungi), M (morbidity) und r (reinfection) were classified for each case. Classification accuracy was calculated separately for each subcategory (r, T, N, and M). Fleiss' kappa (Fk) was calculated to assess interobserver reliability, while Cohen's kappa (Ck) was used for intraobserver reliability.

### **RESULTS:**

All 20 cases (12 male, 8 female, average age 72.2 (40-88 years)) with thirteen hip, six knee and one shoulder PJIs could be classified with the new TNM-PJI classification system. There was a considerable heterogeneity among the cases: 12 prostheses were fixed (T0), six were loosened (T1) and two were associated with a soft tissue defect (T2). Biofilm formation was considered immature in seven cases (N0). 13 PJIs were considered to be associated with mature biofilm formation. Nine patients were systemically not or only mildly compromised (M0), 7 patients moderately (M1) and 3 patients (M2) severely compromised. One patient refused surgical treatment (M3a). Recurrent infections (r) were diagnosed in three cases.

Overall, interobserver (Fk=0.61) and intraobserver (Ck=0.78) agreements were substantial across the 20 classified cases. Subgroup analyses varied from almost perfect interobserver (Fk=0.90) and intraobserver agreement (Ck=0.92) for "reinfection" and moderate interobserver (Fk=0.48) and substantial intraobserver reliability (Ck = 0.68) for "Tissue and implant conditions".

### **DISCUSSION AND CONCLUSION:**

The principles of the TNM classification from oncology can also be used for the classification of PJIs with good interobserver and intraobserver reliability. Despite the limited number of cases of this study, a considerable heterogeneity of the evaluated PJIs is shown, which is a phenomenon, that is also known from clinical practice. This heterogeneity can adequately be addressed by this new classification, which might be beneficial in decision making in the future.