Clinical Management of Joint Arthroplasty

Veit Krenn · Giorgio Perino

Histological Diagnosis of Implant-Associated Pathologies

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Preface

This guide to the histological diagnosis of periprosthetic tissue pathologies in joint arthroplasty is intended to provide a concise, yet comprehensive introduction to the host soft tissue and bone reactions to implants and their wear particulate materials. It is also a practical aid for tissue sampling and processing for the optimal pathological analysis. The target audience comprises orthopedic surgeons, either in practice or in training, as well as clinicians, radiologists, pathologists, and biomechanical engineers who are interested in understanding the details of the histological examination and report.

The text is divided into short chapters providing (a) a broad overview and subtyping of the expanded synovial-like interface membrane (SLIM) proposed as a standardized international classification of pathological changes, (b) criteria for the histological diagnosis of implant infection, (c) response patterns of hypersensitivity/allergic reactions and toxic inflammatory reactions to wear particles and in particular corrosion products, (d) an algorithm for the identification of particles with subclassifications according to their dimensions and morphological features, (e) a practical workflow for the collection and processing of tissue samples, and (f) future perspectives aimed at decreasing the risk of complications and improving outcome with an early and accurate histological diagnosis. Numerous illustrations from our extensive archive of cases are provided for a direct depiction of the criteria used for the identification of both SLIM and particles. Selected references are also provided without the claim of being exhaustive and with the aim of stimulating interest and discussion.

We emphasize the multidisciplinary aspect of the histological diagnosis, which cannot be accurate without the sharing of clinical, laboratory, imaging, and biomechanical data. In fact, this work would not have been possible without the contributions and critiques of all our co-authors and the many colleagues from different medical specialties who have contributed to the development and understanding of this challenging and evolving field of pathology.

We hope that we have succeeded in providing a useful and practical tool for the identification of the many causes of joint implant failures and their revision, and we remain open to any suggestions and criticisms for improvement in the future.

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