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1 Introduction

Non-vascular and oncologic interventional procedures are increasingly performed worldwide. They are mainly carried out by interventional radiologists and almost all interventional radiology (IR) units impart these services since they are minimally invasive and provide the opportunity to gain excellent therapeutic options for the patient, thereby increasing quality of life, and overall survival. The first step of IR is often percutaneous liver biopsy, which is the minimally invasive gold standard for the histopathological evaluation of liver lesions. If the suspected diagnosis is proven by the pathologist, percutaneous thermal ablation procedures are preferred for patients who are not amenable to classical surgery. These minimal invasive options are performed with the help of regional or general anaesthesia and they have revolutionized local tumor destruction. Ablative therapies offer multiple advantages—they have no specificity for selected tumor cells, they are tissue-saving, and they show a reduced rate of morbidity and mortality both in young and elderly patients; they can be performed in conjunction with other cancer treatments and may be repeated if necessary; they require mostly only conscious sedation and local anesthesia, and last but not the least, they go along with shorter hospital stay. In liver lesions with typical imaging features for malignancy, biopsy and ablation can be performed in one intervention in order to minimize trauma. In these cases a coaxial system with the possibility to perform biopsy and ablation successively is preferred.

In specific case, for example for patient with oligometastatic pulmonary secondary malignancies, surgical resection is considered potentially curative and has shown evidence to improve survival. However, frequent surgery is not feasible either due to medical and technical reasons or it is refused by the patient. In these cases, minimally invasive therapies have attained increasing utilization, especially thermoablative techniques like radiofrequency and microwave ablation. Thermal ablation techniques are limited to lesions that are not larger than 5 cm in diameter, and success can be impaired by heat deflection in the vicinity of the vessels. Percutaneous computed tomography–guided interstitial high-dose-rate brachytherapy (iHDR BT) enables the highly conformal administration of therapeutic radiation doses to a circumscribed volume. iHDR BT utilizes a fundamentally different technology from thermal ablation and due to this reason it is independent from the above-mentioned limitations. Moreover, the dose decreases rapidly outside the target volume so that the surrounding healthy tissues can be protected. Because the aim of iHDR BT is not to destroy the target tissue during the intervention, but to induce tissue necrosis developing during approximately 6 weeks in the postinterventional phase, the risk potential of this intervention is comparable to a biopsy procedure. However, every percutaneous manipulation in the lung carries the risk of pneumothorax (3.1% in biopsy). IR can also provide other services in addition to treating local tumors, for example, with the help of local tumor ablation techniques.

Kyphoplasty is a different approach to treat a patient; Balloon kyphoplasty (BK) is effective for the therapy of vertebral compression fractures (VCF) in terms of immediate pain relief, decreased need for painkiller medications, quick functional recovery, and increased mobility. In case of elderly osteoporotic patients who are not amenable for surgery, the pain leads to immobilization, hospitalization, and adjunctive secondary complications. BK is an alternative to conservative medical therapy as well as to stabilizing spine surgery, enabling rapid patient mobilization and prompt reintegration into the social environment. Pain reduction is more pronounced in BK (92%) as compared to vertebroplasty (87%). This might be attributed to the restoration of the collapsed kyphotic angle in BK. The most frequent complication following vertebroplasty and BK is fracture of the adjacent level (41% in vertebroplasty and 30% in BK). This is associated with cement endplate extravasation isolated to the anterior third of the vertebral body.

The examples provided above reflect only some facettes of non-vascular and oncologic services of IR. Due to recent developments in this field, there

is a demand for more information about these procedures. This book tries to provide further information on potential and most frequent complications of the procedures in terms of indications and limitations. Reporting procedural complications and discussing their treatment options as well as potential strategies to avoid them will not only enrich the armamentarium of the readers but also help them avoid complications in the first place and to react better in case they occur.

Thomas Edison once said, "Experience is merely the sum of all our mistakes." To some extent this holds true for physicians. In medicine, however, we should rather be able to learn from mistakes that others have made in order to keep harm from our own patients.