Innovative Techniques in transurethral resection of urothelial bladder carcinoma: combined photodynamic diagnostics and submucosal water-jet dissection

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Abstract

Conventional wire-loop transurethral resection (TURB) of bladder tumours is the therapeutic and diagnostic gold standard. The quality of performance of TURB is essential for the patient, as it determines probability of recurrence and progression to higher tumour stages and possibly tumour specific mortality. But even in high-volume centers specialized for urothelial carcinoma of bladder, high recurrence rates in up to 45% can be seen within 6 months after TURB. This explains the great need for an improvement of conventional TURB. For example photodynamic diagnostic (PDD) is a very promising purchase. Tumours are marked by a fluorescent dye, leading to an improved detection and respectability of tumours, especially CIS. Randomized clinical trials showed an improved recurrence-free survival in patients treated by PDD [Denzinger, Wieland 2007].

One reason for high recurrence rates following conventional TURB is, that it contradicts a basic oncologic principle, namely to resect the tumor en-bloc by dissecting through normal tissue. Usually urothelial carcinomas are shredded during TURB and tumour cells are spilled within the bladder. This issue could be overcome by submucosal dissection (SMD), a very promising resection technique that has been adopted from gastroenterology. The water-jet-dissector HybridKnife® (ERBE Germany) consists of a microcapillary wire that is placed directly on the bladder wall. With a high-pressure water jet of 30bar a fluid cushion is selectively created within mucosa and upper muscular layers below the tumour, facilitating resection. We performed the first clinical evaluation study in patients with urothelial carcinoma of the bladder. 30 single tumours have been resected. No perforation was seen. Time for application of the HybridKnife® seems to be comparable to common wire-loop TURB with a steep learning curve. We conclude that the application of the HybridKnife® in resection of urothelial carcinoma of the bladder is safe and reliable. This new method is an elegant en-bloc resection technique according to oncologic principles. It ameliorates the transurethral resection of urothelial carcinoma of the bladder [Fritsche, Wieland 2010]. Oncologic benefit still has to be proven in further studies addressing recurrence and progression rates.