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**Defining the Value Framework for Prostate Brachytherapy Using Patient-Centered Outcome Metrics and Time-Driven Activity-Based Costing**

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**Purpose:** Despite the availability of several treatment modalities for low-risk prostate cancer (PCa), there has been a steady decline in prostate brachytherapy (PBT) and an increase in more expensive alternatives. As costs of PCa have risen dramatically, there has been no consistent rise in quality of care. Value, defined by outcomes over costs, has been proposed as a unifying framework to improve outcomes and decrease costs. However, outcome metrics are inconsistently reported, and published costs of care reflect piecemeal reimbursements rather than actual resource utilization over the full cycle of patient care. Our aim is to implement standard outcome metrics and time-driven activity-based costing (TDABC) to define the PBT value framework.

**Materials and Methods:** Patients with low-risk PCa treated with PBT between 1998 and 2009 were included in this study. Patients were treated with either intra-operative or pre-planned transperineal techniques. Patient-centered outcome metrics were recorded according to the International Consortium for Health Outcomes Measurement (ICHOM). Acute toxicity was recorded using the Common Terminology Criteria for Adverse Events v4.0 (CTCAE). The expanded prostate cancer index composite-26 (EPIC) questionnaire was administered before treatment and at each follow-up to assess patient-reported health status. Biochemical failure-free survival (bFFS), metastasis-free survival (MFS), PCa-specific survival (PCSS), and overall survival (OS) were recorded for survival and disease control outcome. TDABC analysis measured patient-level costs from initial consultation to one year after PBT.

**Results:** A total of 238 men were eligible for analysis. Median age was 64 (range, 46-81). Median follow-up was 5 years (range, 0.5-12.1). There were no CTCAE Grade 3-5 acute complications within 6 months of PBT. The mean (SD) EPIC scores at 48-months were 88.3 (18.4) for urinary incontinence, 85.4 (14.9) for urinary bother, 94.5 (8.3) for bowel bother, 48.0 (25.2) for sexual function, and 91.1 (10.2) for hormonal function (vitality). There were clinically significant changes from baseline to 1 and 4 months for bowel bother (p = 0.018) and urinary bother (p < 0.001), but no clinically significant changes at other time points. 10-year survival and disease control outcomes included bFFS of 84.1%, MFS of 99.6%, PCSS of 100%, and OS of 88.6%. 41% of total TDABC costs were incurred in the operating room, while 8.7%, 7.6%, and 7.6% of costs were incurred during MRI consultation, and treatment planning. Higher scores represent more favorable outcomes in the value framework (Figure 1).

**Conclusions:** We successfully implemented the ICHOM standard set and measured TDABC costs to define the PBT value framework. Measuring and reporting an identical set of outcomes with a consistent costing methodology using this framework will enable value comparisons across providers, institutions, and treatment modalities, such as proton and photon-based therapies, prostatectomy, and active surveillance. Additionally, this value framework provides a vital link between ongoing cost-containment and process improvement strategies and the full spectrum of patient-centered outcomes.