Preliminary Clinical Experience of Photodynamic Diagnosis Using 5-Aminolevulinic Acid During Radical Prostatectomy for the Detection of Positive Surgical Margins

Introduction and Objectives: The surgical margin status after radical prostatectomy is a significant risk factor for biochemical recurrence and has a negative effect to life prognosis. So we need to excise the whole prostate completely by surgery. We could detect positive surgical margins and excise whole prostate completely by the use of photodynamic diagnosis (PDD) with 5-aminolevulinic acid (ALA) during surgery. Therefore we evaluated the feasibility of new PDD method by 5-ALA in Japanese prostate cancer patients.
Materials and Methods: In all patients with histological-proven prostate cancer who had the positive core in apex by prostate biopsy and highly suspicions of positive margins estimated by Japan PC table. We performed radical prostatectomy to those from February 2009 (open prostatectomy: 18 cases, laparoscopic prostatectomy:9 cases). Three hours prior to surveillance, 1.0g ALA dissolve in 50 ml of 5% glucose solution was given orally though stomach tube under anesthesia. After removal of the prostate, PDD of surgical margins was performed using the laparoscopy (HOPKINSII Straight Forward Telescope30°) and PDD system (KARL STORZ Endoscopy Japan K.K., Tokyo). The laparoscope was positioned in front of the resection margins to illuminate the tissue inside patients (urethral side, bladder side and rectal side). Red fluorescent-position areas were recorded and biopsied. After removal of the prostate, the prostate was sectioned. The tissue sections were also examined by PDD and biopsied. Fluorescent-positive areas were compared with pathological result.
Results: In all 27 patients, one patient demonstrated fluorescence-positive lesion about extraprostatic extention of the harvested prostate in posterior-lateral side and histological examination confirmed adenocarcinoma of Gleason score 3+3. In the sections of the harvested prostate, we obtained 131 biopsied samples in all. The fluorescence positives are 26 samples; the pathological positives were 19 samples. The sensitivity and specificity are 53.9 % and 89.3 % in the sections of harvested prostate. One patient had transient nausea as adverse events and all procedures were well tolerated by all patients.
Conclusion: Intraoperative photodynamic diagnosis is feasible for the detection of positive surgical margins in prostate cancer.