Clinical Implications of Outpatient, Transrectal, MRI-Guided Laser Focal Therapy of Localized Prostate Cancer in a Low Genomic Risk, HIV Positive Patient: A Case Study

Bernadette M. Greenwood, BSc., PG Cert., RT(R)(MR)(ARRT)
John F. Feller, MD
Rob Toth, PhD

INTRODUCTION AND OVERALL GOAL

According to AACR, new prostate cancer cases for 2016 were estimated at 180,890 and deaths at 26,120. According to the U.S. Centers for Disease Control, it is estimated that 1,218,400 persons aged 13 years and older are living with HIV infection, including 156,300 (12.8%) who are unaware of their infection. Our goal is to investigate the safety and feasibility of using outpatient MR-guided laser focal therapy for MR visible, localized prostate cancer in HIV-positive patients with low-risk genomics.

SPECIFIC AIMS

Our specific aims are to use genomic status to risk stratify HIV+ patients for minimally invasive laser focal therapy of prostate cancer and avoid the distress and immune burden of major surgery.

RATIONALE AND BACKGROUND

Perioperative distress and natural killer call activity (NKCA) in healthy patients is well-understood[1] and related to the physical stress of the surgical experience. Avoiding surgery in HIV+ men by combining genomic risk with other risk nomograms may create minimally-invasive alternatives to surgery.

METHOD AND MATERIALS

A 66 y.o. male underwent MR guided laser focal therapy as part of a HIPAA-compliant, IRB-approved clinical trial. His biopsy tissue specimens were submitted for histologic (AIPL, Glen Allen, VA, USA) and genomic evaluation (GenomeDx, San Diego, CA, USA). His MR-visible, 3.3cc 3+4 tumor made him a suitable candidate for our MR-guided laser focal therapy study using MR-thermometry and a transrectal approach. His low-risk Decipher genomic score of 0.28 was reassuring, reflecting only a 1.4% risk for 5-year metastasis and 2.3% risk for 10- year metastasis. His 6 month follow-up MR-guided biopsy[2] of the treatment region was negative as was his 12-month follow-up multiparametric MRI.

RESULTS

In this HIV positive patient with localized, low-genomic-risk, Gleason 3+4 adenocarcinoma, we were able to achieve oncologic control with preservation of urologic and sexual function. The patient required a urinary catheter for 96 hours following the procedure and did not experience infection or other morbidity from the laser focal therapy. His PSA went from 9.9 ng/mL to a nadir of 1.9 ng/mL.

DISCUSSION AND CONCLUSION

With the increase in numbers of men living with HIV infection, it is important that new strategies be adopted to manage prostate cancer in this immunosuppressed population. The precise energy delivery under MRI-guidance in a closed system may have favorable results for oncologic control and quality of life without eliminating the possibility of whole-gland treatment in the patient's future. Additionally it may reduce the risk of exposure of the medical professional team to blood and other potentially infectious materials by the closed, minimally-invasive nature of the procedure.

REFERENCES

1. Yermal SJ, Witek-Janusek L, Peterson J, Mathews HL. Perioperative pain, psychological distress, and immune function in men undergoing prostatectomy for cancer of the prostate. Biol Res Nurs. 2010 Apr;11(4):351-62.
2. Woodrum DA, Gorny KR, Greenwood B, Mynderse LA. MRI-Guided Prostate Biopsy of Native and Recurrent Prostate Cancer. Semin Intervent Radiol. 2016 Sep;33(3):196-205.

Fig. a – Decipher (low risk)

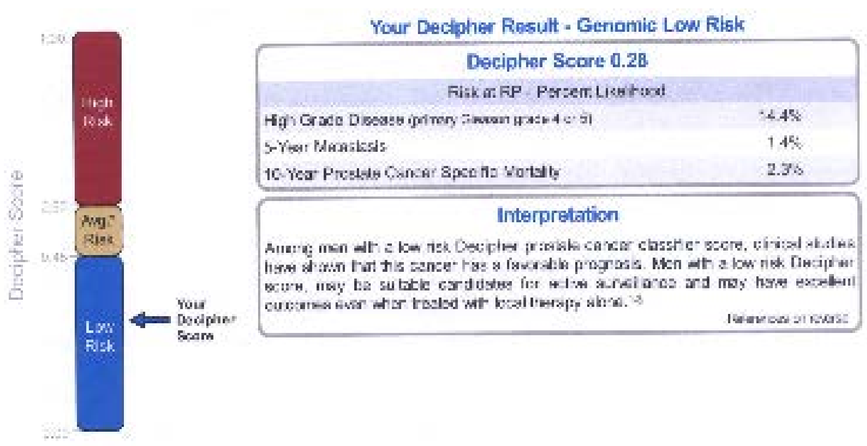

Fig. b, c – Coagulation necrosis

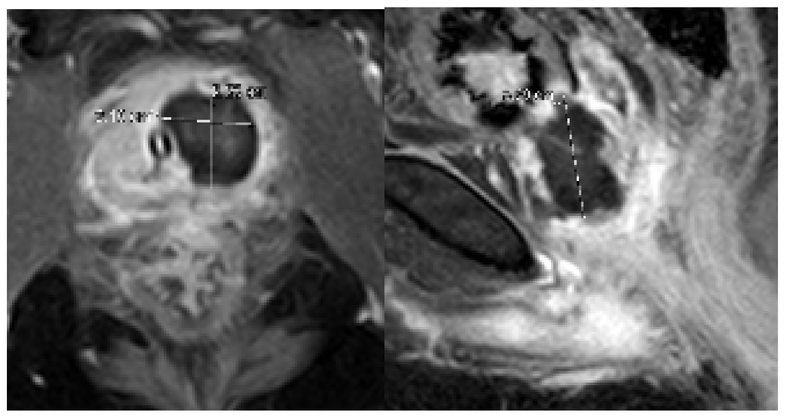

Fig. d – Visualase

Fig. e – In-bore MR-guided bx

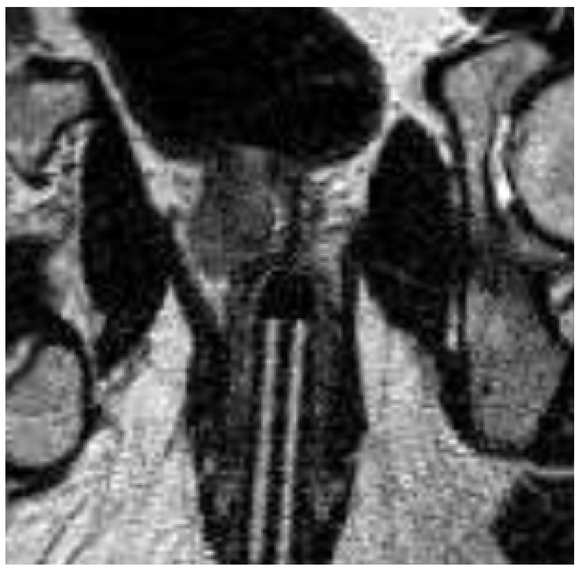

Fig. f – Negative 6 mo. bx