

Deuterium-depleted water delayed hormone therapy of prostate cancer

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Abstract

The anticancer effect of deuterium depletion in combination with conventional therapies has been confirmed in phase II double-blind clinical trial with prostate cancer patients. In this study, we describe the case of a patient who was diagnosed with prostate cancer in 2009. He denied the hormone therapy offered, providing an opportunity for following the effect of deuterium depletion as a single intervention. The patient started consuming deuterium-depleted water (DDW) one month after the diagnosis. Already after one month of DDW consumption, his PSA level dropped from 8.7 ng/mL to 6.3 ng/mL and 1.5 years later, an MRI scan could not confirm the presence of the tumor 1 cm in diameter. The 11 years follow-up of the changes in PSA value proved that deuterium depletion controls the growth of prostate cancer. The data also revealed that increasing the length of the break in DDW consumption from 5-6 months to 11 months promoted the progression of the disease as confirmed by an MRI scan. The patient had 13 courses of DDW treatment in 11 years. This study confirms that deuterium depletion is an effective early-stage treatment as a single therapy and delays conventional therapy. Based on previous studies we also conclude that DDW in proper combination with hormone therapy assists in prolonging the development of hormone resistance.

Keywords: Prostate Cancer, Deuterium (D), Deuterium-Depleted Water (DDW), PSA-value, Case Study, Hormone Therapy, Hormone Resistance

Introduction

The role of the heavy isotope of hydrogen, deuterium (D), in living organism has been intensively investigated since the early 90's, when the first paper about its regulatory role in cell growth was published [1]. The first investigations of D in living organisms (present in ca. 12 mmol/L concentration) focused on its role in cell cycle regulation, cancer development, and gene expression. [2]. By now, the data confirm that the naturally occurring D has strong influence on a wide range of biological processes, like cancer development [3-5], ageing [6], memory [7], cell metabolism [8,9], and physical performance [10].

The apoptosis triggering effect of DDW was observed both in vitro [11] and in vivo [3]. D depletion also exerts complex influence on proto-oncogenes and tumor suppressor genes. Induction of the expression of c-myc, Ha-ras, and p53 genes by carcinogen exposure was significantly inhibited when the experimental animals were given DDW to drink [2]. Similarly, DDW as drinking water resulted in complete or partial tumor regression in mice xenotransplanted with MDA-MB-231 or MCF-7 human breast adenocarcinomas

or PC-3 human prostate tumor [1,11]. DDW treatment of lung cancer patients including those with brain metastases in addition to conventional therapies multiplied median survival time (MST) [12,13]. The anticancer effect of D depletion was also confirmed in a 4-month-long double-blind randomized human phase II clinical trial on prostate cancer [14]. Extended follow-up and retrospective evaluation of 91 prostate cancer patients of the mentioned study suggested that deuterium depletion was able to prolong MST and reduce mortality rate of prostate cancer by slowing the progression of the disease [14]. Prostate cancer represents 13.1% of all new cancer cases in the US [15] and it is the fifth leading cause of cancer death in males. This type of cancer is more common in older than younger men, and more likely to occur in men with a positive family history. The rate of new cases of prostate cancer was 111.3 per 100,000 men per year, based on 2014-2018 cases, age-adjusted [15].

Prostate specific antigen (PSA, also known as kallikrein-related peptidase 3, KLK3) level reflects the progression of disease after diagnosis. It is secreted by prostate epithelial cells into prostatic

fluid. PSA is a potential target for tumor imaging and treatment. PSA exerts antiangiogenic activity related to its enzymatic activity. Thus, it might be associated with the slow growth of prostate cancer [16].

There are different treatment options for consideration to determine the best possible care. Nonsurgical treatments for prostate cancer include androgen-deprivation therapy (ADT), radiation therapy (RT), ablative therapies, chemotherapy, and the novel immunotherapies. These approaches can be used alone or in combination depending on the clinical scenario [17]. All aggressive therapies of prostate cancer do negatively affect erectile function and urinary continence. The decision of which treatment modality to pursue should incorporate shared decision making, and consider cancer risk and severity in addition to patient preferences [18].

Prostate cancer is relatively well treated when diagnosed early. Classical treatment is surgery followed by hormone therapy. Rarely, the patient refuses this form of treatment. In this study, we describe such a case.

Case Description

A 68-year-old patient was diagnosed with prostate cancer at the end of October 2009, with an elevated PSA-value of 8.7 ng/mL. The diagnosis was confirmed with biopsy and MRI showing a tumor of 1 cm diameter in the prostate. The patient refused hormone treatment due to his private circumstances. He started consuming DDW one month after diagnosis (that is, in November 2009) and consumed it periodically in the subsequent 11 years. Table 1 shows the DDW consumption periods over that time span.

Table 1: DDW consumption during the follow-up period of 11 years

	Start of DDW consumption	End of DDW consumption	Duration of DDW cures (days)
1.	27 November 2009	01 July 2010	217
2.	04 September 2010	12 February 2011	162
3.	10 June 2011	31 August 2011	83
4.	01 February 2012	10 August 2012	192
5.	22 February 2013	09 May 2013	77
6.	27 August 2014	23 October 2014	58
7.	21 March 2015	30 May 2015	71
8.	14 October 2015	11 January 2016	90
9.	07 March 2016	05 June 2016	91
10.	17 January 2017	17 April 2017	91
11.	08 March 2018	06 May 2018	60
12.	20 June 2019	24 October 2019	127
13.	28 March 2020	11 September 2020	168

His PSA-value dropped to 6.3 ng/mL by the end of the first month. Two months later, at the end of January 2010, 5.28 ng/mL was measured, and in March, 5.15 ng/mL. The first cure of DDW lasted

7 months without interruption, during which PSA-values ranged from 5.0 ng/mL to 8.0 ng/mL. At the end of the first cure (just before the first break), the PSA-value was 4.68 ng/mL. The patient started another cycle of DDW consumption after a 2-month break, in September 2010, after which he made further courses of 4-5 months duration, and his PSA stabilized around 4-5 ng/mL.

In summer 2010, an outlier value, 24 ng/mL, was measured after the patient's few days long vacation in a thermal spa. However, PSA level dropped again to 5 ng/mL within 2 months (Figure 1).

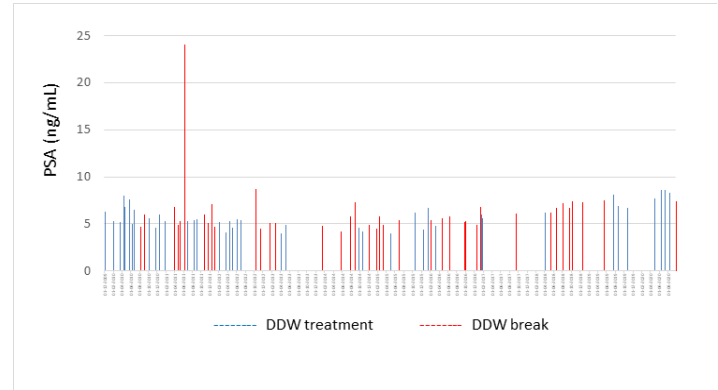


Figure 1: Development of PSA-values of a patient diagnosed with prostate cancer in October 2009, who declined conventional treatment.

In October 2013, the previous tumor of 1 cm diameter could no longer be detected by imaging procedure, and biopsy was also negative.

Over the following 4 years, the patient took breaks of a maximum duration of 5-6 months interrupting DDW courses of 3-4 months durations. Then the patient discontinued DDW consumption for full 11 months due to the stable low PSA-values. After 9 months an increase in PSA-value was observed, indicating that such a long break in DDW consumption favored the tumor cells.

9 years after the first diagnosis and 6 years from the time when the tumor was no longer detected, an MRI-scan showed a tumor in the prostate. The patient restarted DDW consumption again, and at the time of writing this article he was asymptomatic and complaint-free.

Conclusion

Watchful waiting policy is widely accepted in cases where PSA value is elevated but the patient is symptom-free. Since prostate cancer is slow-growing or does not cause symptoms, this policy postpones the invasive interventions like biopsy or conventional therapies.

This study has shown that by proper scheduling of DDW consumption, progression-free status can be maintained for many years while having a good quality of life.

Deuterium depletion, as sole intervention after diagnosis of prostate cancer, resulted in significant improvement in the patient's condition in multiple parameters, including PSA value and size of

prostate tumor. During the break in DDW consumption, a minimal progression of the disease occurred, but the restarted DDW cures resulted in regression again. The cures were repeated 13 times during the follow-up period. This observation is in line with earlier findings on different tumor types, including breast, lung and pancreatic cancer, where integration of DDW into conventional therapies resulted in severalfold increase of median survival time.

This case study proves that application of DDW can provide significant improvement in patients with prostate cancer, it can delay progression and the use of conventional therapy.

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