



# Does cassava help to control prostate cancer? A case report

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## Abstract

Natural products are getting popular among patients as therapy for many diseases. However these remedies should be proven scientifically as some may be hazardous with no proven benefits. Cassava root, used as a carbohydrate rich food in many countries is promoted as a cure for prostate and bladder cancer. Serum prostate specific antigen is a sensitive tumour marker which corresponds to the activity of malignant cells in patients with acinar adenocarcinoma of prostate. We report a patient with hormone-resistant prostate cancer whose serum PSA level continued to rise despite consumption of large quantities of boiled roots of cassava indicating its ineffectiveness in controlling the prostate cancer. Though this is a single case, it provides guidance to health care workers who look after patients with castration-resistant prostate cancer in the absence of more comprehensive research on cassava and its effectiveness on prostate cancer.

**Keywords:** Tapioca, manioc, herbal medicine, prostatic carcinoma, treatment

## Background

Medicinal plants play a vital role in the development of new drugs. There is an increasing interest in remedies for illnesses based on natural products. However these remedies should be proven scientifically as some tend to make unsubstantiated claims of efficacy based on emotions related to illnesses which do not have effective therapy based on established medical practice. Cassava, also known as tapioca or manioc is promoted widely as a cure for cancer in the electronic and printed media especially for bladder and prostate cancer [1,2]. Excess consumption of cassava based on unscrupulous reports can be hazardous [3]. We describe the outcome of a patient with hormone-resistant prostate cancer who tried cassava to control his malignancy.

## Case report

A 65 year old man was diagnosed of having adenocarcinoma of prostate with a Gleason score of 3+3 in 2002. The CT and isotope bone scans did not show evidence of metastases (T<sub>2c</sub>N<sub>0</sub>M<sub>0</sub> stage). The serum prostate specific antigen (PSA) was 11.5 µg/l. He underwent external beam radiotherapy (70 Gy) and bilateral orchidectomy. The PSA decreased to a nadir of 0.02 µg/l and remained around that level till 2008 when it started rising slowly suggesting local recurrence (Figure 1). When PSA was 3.4 µg/l, he had a repeat biopsy which showed an adenocarcinoma of Gleason score 3+5. Flutamide 250mg three times a day brought down the PSA to 0.75 µg/l. After 2 years it started rising gradually and discontinuation of the anti-androgen (flutamide),

caused a drop in the PSA suggestive of anti-androgen withdrawal response. Six months later when the PSA started rising again and reached 9.5 µg/l, oral fosfestrol ('Honvan') 240 mg/ day was started. His serum testosterone level was below 50 ng/dl, which is the cut-off level to diagnose hormone-resistant (castration-resistant) prostate cancer. With oral fosfestrol, the PSA fell to 1.86 µg/l and the therapeutic response lasted for one year. When the PSA rose to 10.4 µg/l in March 2012, he responded to a combination of ketoconazole (200mg three times a day) and hydrocortisone (20mg in the morning and 10mg in the evening). The PSA fell to 0.13 µg/l in six weeks.

At this time the patient came to know through the media about consuming cassava in the diet to control cancers and started consuming 150 g of boiled cassava root (sweet variety) three times a day [2]. He stopped all the medications and consumed boiled cassava root diligently in measured amounts for three weeks. At the end of the three weeks PSA rose to 4.05 µg/l. A week later it increased further and reached 4.95 µg/l despite continuing to consume cassava. He restarted ketoconazole and hydrocortisone and the PSA level dropped to 3.24 µg/l after one week. All PSA levels were done in the same laboratory and there was no clinical or microbiological evidence of urinary infection during the period when the patient consumed cassava.

## Discussion

Cassava also known as manioc and tapioca (*Manihot esculenta* Crantz), has been used as a food for centuries. It

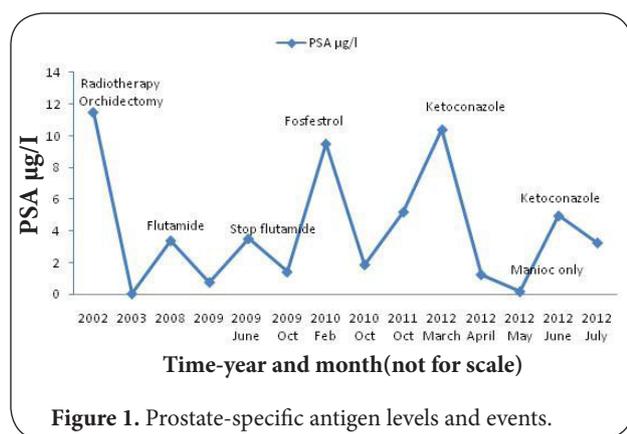


Figure 1. Prostate-specific antigen levels and events.

originated in South America and was introduced to Africa by the Portuguese in the sixteenth century [4]. It is a rich source of carbohydrates and grows in dry conditions with little water. Today it is consumed by millions of people around the world [5]. There are two types of cassava – sweet and bitter varieties. Sweet variety is preferred by consumers as it is more palatable while the bitter variety is preferred by farmers as it is more resistant to pests. Both cassava root (tuber) and leaves are used as herbal medicine especially in Africa and South America [6]. Although it has not been used in the past by native physicians of India and Sri Lanka in their traditional medical therapies like 'Ayurveda' [7], in recent times boiled roots of cassava is being promoted as a potential cure for prostate and bladder cancer in Sri Lanka [1,2].

Linamarin, the main cyanogenic glucoside in manioc has been shown to cause toxicity to malignant cell lines [8]. A nested case control study conducted in India to identify the effect of dietary factors on causation of breast cancer using food frequency questionnaires has shown that consumption of tapioca is associated with a decreased risk of developing breast cancer [9]. The cyanogenic glucosides (linamarin and lotaustralin) in cassava leads to the production of amygdaline or vitamin B-17 which is claimed to kill cancer cells by those who promote cassava as an anti-cancer agent [2]. However two case-control studies from India have shown that cassava consumption is associated with a higher risk of colorectal and pancreatic carcinoma [10,11]. In addition cassava may cause ataxic polyneuropathy, amblyopia and tropical pancreatitis as reported in several case reports from India and Nigeria [11,12]. Therefore it is prudent that we determine both the safety and efficacy of cassava in treating prostate cancer before it is promoted as a treatment.

Despite clinical and analytical limitations, PSA is an effective surrogate marker of cancer activity of already diagnosed cases of acinar adenocarcinoma of prostate [13]. This patient's cancer was treated with accepted and proven forms of treatment in a stepwise manner and as expected, PSA levels varied accordingly with each form

of treatment. This predictable response was confirmatory of its applicability as an efficient marker of malignant cell activity of this patient. However the PSA level rose while on cassava indicating its ineffectiveness in controlling the cancer. It appears that consumption of cassava in large quantities in the diet has no biochemically evident therapeutic benefit in castration-resistant prostate cancer.

Anti-androgen withdrawal is a potential therapeutic manoeuvre for patients with progressive prostate carcinoma. About 19% of patients with prostate cancer experience a progression-free period of over one year after cessation of anti-androgens [14]. Some patients who discontinue all medications including anti-androgens and start consuming cassava may experience a reduction in PSA due to this phenomenon but may attribute it to the consumption of cassava.

A single case may not be adequate to test a hypothesis. However in the absence of scientific publications about the effects of cassava on prostate cancer, this scientifically tested case would act as a basis of evidence that can be used by health care workers who look after patients with castration-resistant prostate cancer as well as by patients with the disease until further research is done and better evidence is available.

#### Competing interests

The authors have no financial or other interests related to this article.

#### Authors' contributions

AMA conceived the idea, performed the literature search, wrote the manuscript and managed the patient. KHP helped with the literature search and management of the patient. Both read and approved the final manuscript.

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