Journal of Ayurveda and Integrative Medicine xxx (2017) 1–4

Contents lists available at ScienceDirect

Journal of Ayurveda and Integrative Medicine

journal homepage: http://elsevier.com/locate/jaim

Review Article

Urine therapy in Ayurveda: Ancient insights to modern discoveries for cancer regression

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ARTICLE INFO

Article history:
Received 18 August 2017
Received in revised form
26 August 2017
Accepted 2 September 2017
Available online xxx

"The problem is not what makes the cell divide, but what has gone wrong with the mechanism so that it cannot stop? A cancer cell is comparable to a car on a slope. If it starts running, the question is not what makes it go, but what's wrong with the brake?" – Albert Szent-Gyorgyi (Nobel Laureate) [1].

Cancer, in its diverse forms, continues to be a formidable therapeutic challenge, notwithstanding significant advances in cancer cell biology and molecular oncology. Malignant melanoma is a feared tumour due to its invasive nature and a relative resistance to chemotherapy. It is surprising to note that well-documented spontaneous regressions have been reported in patients with malignant melanoma and in other types of cancer [2,3]. Spontaneous regressions of cancer, though rare, are 'Nature's whispers' which compel us to search for the mechanisms which underlie such phenomena. However, it is well nigh impossible to organize randomized double blind trials to investigate the veracity of such rare regressions or to identify the responsible mechanisms in individual cancer patients. Are there any alternate paths to study this problem with vignettes, case profiles and qualitative research?

In the year 1966, I was reading a review by Everson on case-reports and vignettes of patients with well-documented regression of several types of cancer [4]. What impressed me most was the vignette of 13 patients with cancer of the urinary bladder that had shown a regression, on a follow up cystoscopy, after ureterosigmoidostomy. Everson and Cole proposed that the regression, after diversion of the urinary stream before cystectomy, was due to the lack of the continued presence of the carcinogen in the bladder [5]. But this explanation does not stand to reason. This is because, as per the sequence of carcinogenesis, once a tumour is induced the presence of the chemical carcinogen is no longer needed. I instead proposed, in 1966, that a putative anti-cancer substance (A.C.S.) is excreted in the urine which has a low renal threshold and is not reabsorbed by the renal tubules. As a consequence, A.C.S. could never reach effective and sustained plasma/tissue levels to be effective against cancer (Fig. 1). But with the urinary diversion into the colon, A.C.S. could be reabsorbed continuously into the systemic circulation and hence reach adequate levels and precipitate a cascade of tumour regression [6].

The very next year-in 1967 – I went to the Yale Medical School as a Merck International Fellow in the Division of Clinical Pharmacology and Cancer Chemotherapy. There I found, in the hospital archives, a case report of a patient with leiomyosarcoma. After surgical removal, the tumour did not recur over the years. However during the same period, she had developed a postsurgical vesicovaginal fistula, which could not be successfully repaired after several attempts. Later, when the fistula was finally successfully repaired the tumour came back with an aggressive vengeance and patient died with widespread metastases. This supported the argument of a systemic absorption of A.C.S., from the vaginal mucosa, due to the irreparable fistula, and consequently a long term suppression of tumour. Once the fistula was repaired and there was no leakage of urine into vagina the tumour was not suppressed by A.C.S., unavailable systemically. I also, then, studied all the extensive literature on cancer-promotive and regressive substances in tissues and biological fluids [7–10]. I came across the seminal work, by Williams and Waters, on human urinary extracts inducing tumour regression of Twort alveolar carcinoma in rats [11]. The work done by Albert Szent-Gyorgyi and colleagues, on the anti-cancer-retine- from tissues and human urine, became known [11–14]. But their focus was only on the keto-aldehydes and methyl glyoxal in urine extracts. The isolated compounds lacked anti-cancer activity. This led to a general apathy and disinterest in these remarkable findings by a Nobel Laureate and his colleagues.

I was aware that the book 'The Water of Life', by Armstrong, had inspired many abroad and also in India to pursue auto-urine therapy movement. There were claims of cancer regression with urine therapy in the lay press and in many books [15,16]. As a clinical

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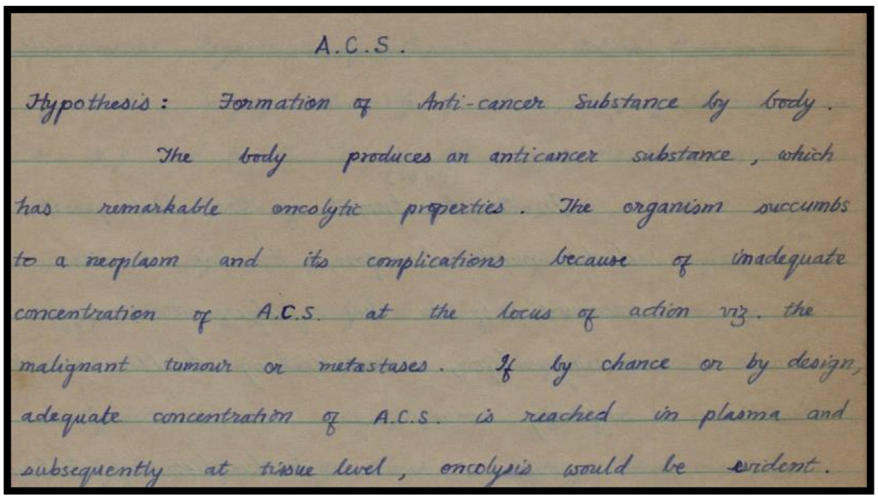
Peer review under responsibility of Transdisciplinary University, Bangalore.

https://doi.org/10.1016/j.jaim.2017.09.005

Please cite this article in press as: Vaidya ADB, Urine therapy in Ayurveda: Ancient insights to modern discoveries for cancer regression, J Ayurveda Integr Med (2017), https://doi.org/10.1016/j.jaim.2017.09.005


A.C.S.

Hypothesis: Formation of Anti-cancer Substance by body.

The body produces an anticancer substance, which has remarkable oncolytic properties. The organism succumbs to a neoplasm and its complications because of inadequate concentration of A.C.S. at the locus of action viz. the malignant tumour or metastases. If by chance or by design, adequate concentration of A.C.S. is reached in plasma and subsequently at tissue level, oncolysis would be evident.

Fig. 1. The diary record of the hypothesis on 20th April, 1966.

pharmacologist, I was quite wary of some of the tall claims and also of a heavy endorsement of auto-urine by a freedom fighter and later the prime minister of India-Sri Morarji Desai. He ascribed his being in pink of health, in his eighties and nineties, to his long practice of auto-urine consumption [17]. There were also several meetings and conferences on auto-urine therapy in India.

There are references in the classical texts of Ayurveda on urines from eight animals, including from humans [18,19]. Their properties and activities are different based on the source. A very interesting reference to human urine as a treatment of cancer is described in a manuscript – Bhrigu Samhita. The shlokas run like this: "After going to the urinal, one should collect one's midstream urine in a clean vessel. One should take 1 to 2 tola of urine on a fasting stomach for the duration of one mandal (circa 42 days). The regimen of pathya diet and healthy life style has to be followed" [20]. There is also a chapter on auto-urine therapy in an ancient manuscript of Yoga –Damar Tantra, published by Athavale in an Ayurvedic journal (1960) [21]. The instructions are similar to those given by Bhrigu. However, the verses numbered 22 and 23 are relevant in view of a case described (*vide infra*). Therein it is stated that if auto-urine is taken for six months continuously with *Amruta* (*Tinospora cordifolia nee glabra*) mixed in urine, it will make the person free of serious diseases and s/he will be healthy and happy. There is also a documented centuries-long and current usage of auto-urine drinking in Buddhist and Yogic traditions. This is said to improve resistance to diseases and a sense of well-being.

There are thousands of small molecules in urine. As a consequence, it is not easy to isolate and identify the specific anti-cancer bioactive. The variability of these ingredients, based on diet, exercise and life-style, is an added challenge to research. In addition, there is a repugnance to urine therapy for aesthetic reasons and due to its smell and taste. This has naturally prevented a serious interest in the domain. But I felt that there is a need to at least to study this further. This can be first done experimentally and then in case reports/vignettes. To neglect all the aforesaid hits/leads by reputed scientists and shastras would not be fair. We should miss out any chance to understand the host mechanisms for cancer control which may help patient care.

At Yale, I learnt from Dr van Woert (a pioneer in l-dopa therapy of Parkinson's disease) and Dr Sartorelli (a leading onco-pharmacologist) how to transplant melanoma in mice. Then I carried out a preliminary experiment, which I love to share after many years. My mentor Dr Robert Levine (medical ethics guru) and Dr Arnold Eisenfeld (discoverer of oestrogen in the hypothalamus) were quite supportive to let me test the idea in their laboratory. Black male mice C57 BL/10 (n = 23) were received from the Jackson Laboratories, Bar Harbor, Maine. These were housed and taken care of with good laboratory practice. The mice were transplanted with uniform pieces of B-16 melanoma (*circa* 3 mm in diameter) subcutaneously, with a trocar and cannula. The control group (n = 11) and the treatment group (n = 12) were housed in metabolic cages (3 mice/cage, except in the last control group-2/cage). The access to food was kept overnight only. The collection of urine, cleaning of cages and weighing of mice were as per standard procedures. The urine was collected for 6 h in centrifuge tubes, covered with aluminium foil. The tubes were kept on ice in glass beakers. In the treatment group, 0.5 ml of pooled urine (from the same cage) was injected intraperitoneally with a sterile syringe. The control group received 0.5 ml of normal saline i.p. The tumour size on the marked animals was measured with a calliper for the diameters, carefully, basally and every three days,. The animals were observed for morbidity and mortality. The statistical analysis of the data on body weights and tumour size was carried out with Student's 't' test.

The increase in the mean body weights of the control group and treated group were not significantly different. Fig. 2 shows the values of the mean tumour volumes of melanoma. These were 12.87 ± 1-61 (S.E.) cm^3 in the control group and 8.56 ± 0.69 cm^3 in

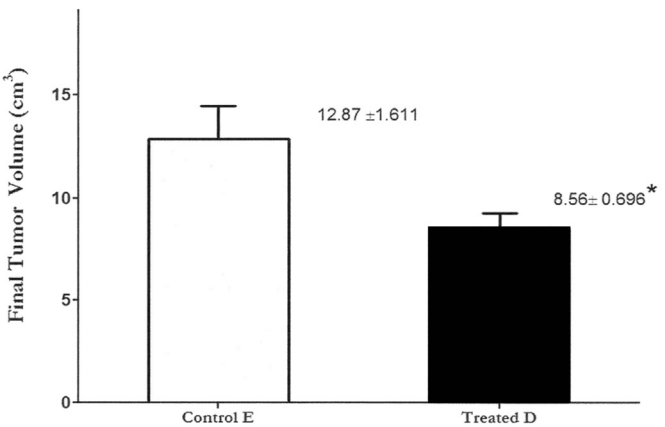


Fig. 2. The difference in melanoma volumes between the control and auto-urine treated groups (*p < 0.05).

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