Human sperm and other seminal constituents in male infertile patients from arsenic and cadmium rich areas of Southern Assam.

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Abstract
In the present study the occurrence of two heavy metals, arsenic and cadmium, have been reported in the drinking water and seminal plasma of infertile male patients as compared to a control group. The study originated from a survey of geogenic groundwater contamination with the heavy metals arsenic and cadmium in Southern Assam, India as an increase in the incidence of male infertility was being reported from these areas. According to WHO protocol, patients with sperm concentration < 20 x 10(6)/ml were selected as cases (oligozoospermic and azoospermic), and those with > 20 x 10(6)/ml, without any extreme pathological disorders and having fathered a child within 1-2 years of marriage were the control (normozoospermic) group. The study reports an inverse relationship between total sperm count and heavy metal content in drinking water as well as seminal plasma of the subjects. Moreover, a high correlation between altered semenological parameters and lower expression of accessory sex gland markers like fructose, acid phosphatase, and neutral α-glucosidase in the seminal plasma of patients is reported. The study also highlights significant differences of the sperm function parameters like hypo-osmotic swelling, acrosome reaction, and nuclear chromatin decondensation in the patient group as compared to controls. These findings are significant as they address a likely association between heavy metal stress and altered sperm function as well as seminal enzyme inhibition.