



Editorial

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Fine Particulate Matter and Urology: Emphasis on the Lower Urinary Tract

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Particulates, usually referred to as particulate matter (PM) or atmospheric PM, are microscopic solid or liquid matter suspended in the atmosphere [1]. PM with a diameter under 10 μm can be inhaled via the respiratory system, resulting in negative direct or indirect effects on human health. The International Agency for Research on Cancer and the World Health Organization (WHO) have identified group 1 carcinogens in airborne PM [2], which could result in DNA mutations, cardiovascular disease (CVD) mortality, and premature death [3]. The WHO classifies particulate dust as a group 1 carcinogen.

Over the last decade, the harmful effects of PM inhalation including its relationship to respiratory disorders, CVD, and the premature onset of related health conditions, have been an important topic for the entire health field. The WHO reported its grievous effects in 2005 in an analysis that included mortality; PM was found to be responsible for about 3% of mortality from CVD and respiratory disease, about 5% of mortality due to cancer of the respiratory system, and about 1% of mortality due to acute respiratory infectious disease in children [4].

In the urologic field, PM has also emerged as an important issue during the last decade, and the effects of PM have been explored in various experimental studies regarding the indirect or environmental effects of cigarette smoking [5-7]. Sidestream smoking, or passive smoking, could be a risk factor for new cases of urothelial cancer [6,7]. Current research is engaged in elucidating the molecular mechanisms of the epithelial-mesenchymal transition and the how mutagens induce malfunctions in DNA repair. However, although it is taken for granted that

smoking releases carcinogenic PM, more efforts are needed to further characterize the sources of PM and to analyze its relationships with diseases beyond urothelial cancer.

Basic research on PM and its clinical effects on the urogenital system are limited to narrowly conducted observational research investigating tumors and related diseases. The upper and lower urinary tracts consist of organs that continually produce, store, and release metabolites. Patient groups — the elderly, infirm, and those with chronic diseases — that are prone to lower urinary tract diseases are also high-risk groups for PM exposure. It is therefore equally important for the field of urology to conduct systematic research into the proper management of these patients in order to reduce the harmful health impacts of fine particulates.

Fortunately, recent studies have focused on the harmful effects of PM on the male reproductive system [8,9], and on iatrogenic PM exposure through surgical smoke during urologic surgery. Although the current evidence is limited to the experimental and preclinical levels, this will stimulate large observational studies to elucidate the real risks of PM.

The most effective measure for tackling PM and its health impacts is to implement a macroscopic policy that controls the sources of fine particulates. Prior to large-scale policymaking, it is necessary to systematically conduct foundational, epidemiological, and clinical research that goes through the process of medical inquiries, verification processes, and meticulous peer review. Kim [10] in this issue presents the relationships between PM and urologic disease, serving as a good starting point for



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further research. Through this review, although the current literature is limited, readers can obtain an overview of the effects of PM on urologic disease, its mechanisms, and the risks that it may pose.

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