The preventive effect of \textit{N}-butanol fraction of \textit{Nigella sativa} on ethylene glycol-induced kidney calculi in rats

Mousa-Al-Reza Hadjzadeh, Abolfazl Khajavi Rad, Ziba Rajaei, Maryam Tehranipour, Nahid Monavar

\textsuperscript{1}Department of Physiology and Neuroscience Research Center, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
\textsuperscript{2}Department of Biology, Islamic Azad University, Mashhad, Iran

Abstract

\textbf{Background:} The current study was carried out to determine whether the aqueous-ethanolic extract or the butanolic fraction of \textit{Nigella sativa} (NS) seeds could prevent or reduce calculi aggregation in experimental calcium oxalate nephrolithiasis in Wistar rats. \textbf{Materials and Methods:} Male Wistar rats were randomly divided into 5 groups: group A received tap drinking water for 28 days. Groups B, C, D and E received 1\% ethylene glycol for induction of calcium oxalate (CaOx) calculus formation for 28 days. Rats in groups C, D and E also received aqueous-ethanolic extract of NS, \textit{N}-butanol fraction and \textit{N}-butanol phase remnant of NS, respectively, in drinking water at a dose of 250 mg/kg for 28 days. Urine concentration of oxalate, citrate, and calcium on days 0, 14, and 28, and also serum concentration of magnesium and calcium on days 0 and 28, were measured. On day 29, kidneys were removed for histopathologic study and examined for counting the calcium oxalate deposits in 10 microscopic fields. \textbf{Result:} Treatment of rats with \textit{N}-butanol fraction and \textit{N}-butanol phase remnant of NS significantly reduced the number and size of kidney calcium oxalate deposits compared with ethylene glycol group. Urinary concentration of oxalate in all experimental groups increased compared with control group on days 14 and 28, whereas the urine citrate concentration was lower in all experimental groups compared with control group on days 14 and 28. \textbf{Conclusion:} \textit{N}-butanol fraction and \textit{N}-butanol phase remnant of NS showed a beneficial effect on calcium oxalate deposition in the rat kidney. Therefore, the butanolic fraction of NS may be suggested for prevention of calcium oxalate calculi in humans.

\textbf{Keywords:} Calcium oxalate, ethylene glycol, kidney calculi, \textit{N}-butanol fraction, \textit{Nigella sativa}

\textbf{DOI:} 10.4103/0973-1296.90416