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# Endourologic Procedures of the Upper Urinary Tract and the Effects on Intrarenal Pressure and Temperature

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## Introduction

Endourologic procedures, including ureteroscopy (URS) and percutaneous nephrolithotomy (PCNL), are associated with an elevation in intrarenal pressures (IRPs) and irrigation temperatures. Recent research has focused on methods to reduce IRP and irrigation temperatures, with the ultimate goal to limit the consequences associated with these deviations. The purpose of our study is to provide a narrative review on the effects of endourologic procedures on pressure and temperature and provide recommendations to minimize these changes.

## Methods

A literature review was performed using PubMed. The search was limited to English human and nonhuman studies. Abstracts were reviewed for inclusion in our narrative review.

## Results

Human and animal models suggest that URS and PCNL are associated with peak IRPs above a “safe” threshold. Strategies to minimize pressures focus on minimizing irrigation flow into the upper tract and maximizing flow out of the system. High IRP has been associated with postoperative pain and infectious complications. Elevated irrigation temperatures are associated with high-power lasers during URS. Strategies to minimize irrigation temperatures focus on maximizing irrigation flow during laser activation and minimizing thermal energies associated with lithotripsy.

## Conclusion

Rises in pressure and irrigation temperatures associated with endourologic procedures are becoming increasingly recognized in the urologic community. Human studies examining “safe” thresholds for IRP and irrigation temperatures are limited. Temperature- and pressure-sensing technologies will aid in identifying the clinical consequences of elevated IRPs and irrigation temperatures, resulting in strategies to minimize them.



[Link to abstract](#)

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