Electricity enhanced delivery of drugs into the ureter, renal pelvis, and renal parenchyma

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BRIEF DESCRIPTION

The invention entails a unique catheter device utilizing electromotive drug administration (EMDA) to enhance drug penetrance into tissues of the ureter, renal pelvis, and calyces. By incorporating a conductive wire and fluid delivery system, the catheter enables targeted drug delivery, potentially revolutionizing the treatment of kidney stones, urothelial carcinoma, infections, and inflammation without systemic side effects.

SUGGESTED USES

The suggested uses of the invention include:

- Facilitating stone removal procedures by promoting ureteral dilation and enhancing the efficiency of ureteroscopy.
- Delivering chemotherapy agents directly to upper tract urothelial carcinoma (UTTUC) for targeted treatment without systemic side effects.
- Providing muscle relaxants, antibiotics, and anti-inflammatory drugs to treat kidney infections, inflammation, and other kidney-related conditions with higher tissue concentration and efficacy.

FEATURES/BENEFITS

Features:

-Utilizes a unique catheter design with a conductive wire for electromotive drug administration (EMDA).

-Multiport component allows for fluid delivery to target tissues in the ureter, renal pelvis, and calyces.

-Conductive wire enables electrical stimulation to enhance drug penetration into tissues.

-Fenestrations along the catheter body facilitate drug delivery to deep tissues.

-Designed for targeted drug delivery, avoiding systemic side effects.

Benefits:

-Enhances the penetrance of drugs into tissues, improving treatment efficacy.

-Facilitates stone removal procedures by promoting ureteral dilation, potentially reducing the need for invasive surgeries.

-Enables targeted delivery of chemotherapy agents for the treatment of upper tract urothelial carcinoma, minimizing systemic side effects.

-Provides a safer and more efficient method for delivering medications to treat kidney-related conditions, such as infections and inflammation.

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OTHER INFORMATION

KEYWORDS

Electromotive Drug Administration (EMDA), Catheter-based drug delivery, Urology, Targeted drug delivery, Ureteral dilation, Renal pelvis, Calyces, Chemotherapy, Urothelial carcinoma, Stone removal

CATEGORIZED AS

- **Medical**
  - Delivery Systems
  - Devices
  - Disease: Cancer
  - Other

RELATED CASES

-Offers a paradigm shift in kidney treatment, potentially reducing hospital admissions and improving patient outcomes.

2022-980-0

TECHNOLOGY DESCRIPTION

The invention works by combining a specially designed catheter with electromotive drug administration (EMDA) to facilitate targeted drug delivery into the tissues of the ureter, renal pelvis, and calyces. Here's how it works:

- Catheter Design: The catheter is equipped with a conductive wire and a multiport component. The catheter body contains fenestrations along its length to allow for the delivery of fluids to the target tissues.
- Fluid Delivery: A fluid containing medication is directed through the multiport component of the catheter. This fluid travels through the catheter body and exits through the fenestrations, reaching the tissues of interest in the ureter, renal pelvis, and calyces.
- Electrical Stimulation: Simultaneously, electrical stimulation is applied through the conductive wire within the catheter. The electrical current enhances the penetration of the medication into the tissues by repelling charged drug molecules from the wire, facilitating deeper drug delivery.
- Targeted Drug Delivery: The combination of fluid delivery and electrical stimulation allows for targeted drug delivery into the tissues, bypassing systemic circulation and minimizing systemic side effects.
- Treatment Effects: The delivered medication can then exert its therapeutic effects locally, such as promoting ureteral dilation for stone removal, delivering chemotherapy agents for cancer treatment, or providing antibiotics and anti-inflammatory drugs for infection and inflammation.

Overall, the invention offers a novel approach to targeted drug delivery in urology, potentially improving the efficacy and safety of treatments for various kidney-related conditions.

STATE OF DEVELOPMENT

Prototype stage

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,544,567	02/10/2026	2022-980

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