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ChatGPT-4 in Nephrolithiasis Management

Satomi Kiriakedis

Keywords

Urine Specimen Collection; Urologists; Diet; Intelligence; Language

Abstract

Purpose: The increasing incidence of nephrolithiasis underscores the need for effective, accessible tools to aid urologists in preventing recurrence. Despite dietary modification's crucial role in prevention, targeted dietary counseling using 24-hour urine collections is underutilized. This study evaluates ChatGPT-4, a multi-modal large language model, in analyzing urine collection results and providing custom dietary advice, exploring the potential for artificial intelligence-assisted analysis and counseling.

Materials and Methods: Eleven unique prompts with synthesized 24-hour urine collection results were submi ed to ChatGPT-4. The model was instructed to provide five dietary recommendations in response to the results. One prompt contained all "normal" values, with subsequent prompts introducing one abnormality each. Generated responses were assessed for accuracy, completeness, and appropriateness by two urologists, a nephrologist, and a clinical dietitian.

Results: ChatGPT-4 achieved average scores of 5.2/6 for accuracy, 2.4/3 for completeness, and 2.6/3 for appropriateness. It correctly iden fied all "normal" values but had difficulty consistently detecting abnormalities and formulating appropriate recommendations. The model performed particularly poorly in response to calcium and citrate abnormalities and failed to address 3/10 abnormalities entirely.

Conclusions: ChatGPT-4 exhibits potential in the dietary management of nephrolithiasis but requires further refinement for dependable performance. The model demonstrated the ability to generate personalized recommendations that were o en accurate and complete but displayed inconsistencies in identifying and addressing urine abnormalities. Despite these limitations, with precise prompt design, physician oversight, and continued training, ChatGPT-4 can serve as a foundation for personalized medicine while also reducing administrative burden, indicating its promising role in improving the management of conditions such as nephrolithiasis.