A Systematic Review of Artificial Intelligence in Urology: Opportunities, Challenges, and Ethical Considerations

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Introduction

- AI is transforming urology (diagnostics, treatment, patient care).
- Technologies: Machine Learning, Deep Learning, Natural language Processing → enhance decision-making & personalization.
- Promising benefits, but adoption is limited.
- Key concerns: effectiveness, clinical integration, ethics.

Aim:

- Review opportunities, challenges, ethical issues

Results

- Prostate Cancer Diagnosis: AI improves detection & risk stratification.
- Robotic Surgery: improves precision & reduces complications.
- Predictive Modeling: forecasts outcomes, variable across demographics.
- Adoption inconsistent due to lack of standardization & workflow integration.

Confusion & Ethical Dilemmas

- Accountability: who is liable for AI errors?
- Bias & Data Quality: risks from poor training datasets.
- Privacy & Consent: sensitive patient data issues.
- Dehumanization of Care: reduced doctor-patient relationship.

Conclusion

- AI has potential to revolutionize urology.
- Benefits: accuracy, personalization, efficiency.
- Barriers: ethical, regulatory, integration challenges.
- Future: improve algorithms, ensure data quality, set regulations.
- Goal: harness AI while preserving human-centered care