

Impact of Methenamine Hippurate on Postoperative Urinary Retention & Infections

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Introduction/Objective

- Postoperative urinary retention (POUR) following pelvic organ prolapse (POP) and incontinence surgery is common with rates ranging from 2.5-43%.
- POUR is managed by bladder decompression, either by straight catheterization or with placement of indwelling catheter.
- Indwelling catheters are associated with increased rates of urinary tract infection (UTI) with a 5% increase in risk of bacteriuria for each day of catheterization.
- Surgery on the pelvic floor also carries an increased risk of UTIs.
- The Infectious Disease Society of America recommends against prophylactic antibiotic use in patient with short and long-term catheterization. This recommendation has fueled investigation of other agents in an effort to reduce rates of UTI.
- Methenamine hippurate (MH) is a well-established bacteriostatic agent that has been investigated for decades due to its potential to prevent UTIs without the risk of contributing to bacterial resistance. In the urine, methenamine is hydrolyzed to formaldehyde & hippuric acid, both of which provide bacteriostatic effect with hippuric acid additionally providing acidification of the urine.
- Use of MH in patients undergoing POP as well as those requiring an indwelling catheter, has been shown to be safe.
- In April 2024, there was a change in practice at our institution; patients who failed their voiding trial following POP and/or SUI surgery, who were then discharged home with an indwelling catheter were discharged on course of methenamine hippurate (1 gram orally twice per day) for duration equivalent to that of their indwelling catheter.
- The primary objective of our study was to investigate the impact of MH on duration of acute POUR.
- Secondary endpoints were diagnosis of UTI within the first six and twelve weeks postoperatively.

Material & Methods

- This retrospective study included patients undergoing POP or SUI surgery between April 1 – November 30, 2023, and April 1 – November 30, 2024. Exclusion criteria included surgery outside collection dates; known MH allergy/sensitivity; medications or conditions affected by MH; preoperative urinary retention (PVR >150); intraoperative cystotomy or other condition requiring long-term catheterization.
- POUR duration and incidence of postoperative UTI (at 6 and 12 weeks) was compared utilizing odds ratio with 95% confidence interval.
- Linear regression examined the relationship between catheter days and MH with covariates of age and BMI. Logistic regressions examined the relationship between UTI and MH, with covariates of catheter days and age.

Results

Of the 217 eligible patients, 35 patients (22 in 2023 verses 13 in 2024) were discharged with indwelling catheters. All 2023 patients plus 5 in 2024 who did not receive MH were compared to the 8 in 2024 who received it.

There was no difference in age, menopausal status, BMI or EBL between the two groups (Table 1).

Table 1: Demographics of Study Participants

	Methenamine Hippurate (n = 8)	No Methenamine Hippurate (n = 27)	P-value
Age, mean (SD)	60.5 ± 10.6	54.3 ± 11.1	0.17
Body Mass Index, mean (SD)	31.6±5.3	30.8 ± 5.8	0.71
EBL, mean (SD)	106.9±114.1	74.2±45.2	0.45
Premenopausal, n (%)	3 (37.5)	13 (48.2)	0.70
Preoperative UTI within 6 months of surgery, n (%)	0 (0)	0 (0)	0.40

Duration of catheter placement in the MH group was 4.00 ± 3.29 days (95% CI 1.25-6.75) compared to 4.93 ± 3.82 days (95% CI 3.4-6.44).

Age and duration of catheter placement were found to predict postoperative UTI while use of MH was not. (Table 2)

Table 2: Impact of Methenamine Use, Age & Duration of Catheter Placement on Incidence of Postoperative UTI

	UTI within 6 weeks		UTI within 12 weeks	
	Odds Ratio	95% Confidence Limits	Odds Ratio	95% Confidence Limits
Use of Methenamine	2.63	0.38-18.13	5.28	0.67-41.75
Age	1.09	1.00-1.19	1.11	1.01-1.22
Duration of Catheter	1.41	1.08-1.83	1.46	1.09-1.95

Conclusions & Future Directions

- While the use of MH was found not to have statistically significant impact on duration of catheter placement, the difference of discontinuing an indwelling catheter by a day may be clinically significant.
- Data supports that increased rates of postoperative UTI are associated with increased age and duration of catheter placement.
- MH use does not appear to impact incidence of UTI.
- The greatest limitation was the small sample size; five patients were discharged home without MH, when they should have received the medication. Informal education was provided to PA/Resident teams in effort to reduce number of missed patients
- Duration of accrual was expanded, and data collection remains ongoing.
- Future investigation could expand the patient population given MH to all patients following POP and/or SUI and investigate impact of postoperative UTI with stratification for patient who did and did not require postoperative indwelling catheter placement for POUR.

Acknowledgments & References

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