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BACKGROUND

- Studies have shown a more than two-fold mortality risk in patients with severe sepsis from obstructive pyelonephritis (OPN) who are not treated with decompression as opposed to those treated with decompression. Therefore, patients with OPN require urgent decompression via retrograde ureteral stenting (RUS) or nephrostomy tube (NT) placement.
- In May 2016 the Urology and Interventional Radiology (IR) departments at our institution enacted a protocol regarding the management of patients with OPN that enabled urologists to more swiftly engage IR for NT decompression should the urologist decide to pursue NT (Fig. 1).
- Our objective was to assess this protocol's impact on outcomes including time to NT and length of stay (LOS).

METHODS

- We retrospectively reviewed all patients at our institution who underwent NT placement from 2012–2018 or RUS from 2014–2018 for stone related OPN meeting sepsis criteria.
- Univariate descriptive statistics (t-test or Mann-Whitney U test for continuous and chi-square for proportions) were used to compare patient characteristics and outcomes between RUS and NT and between NT pre- and post-protocol.
- Multivariable logistic regression assessed predictors of prolonged LOS (>6 days).

IMPLEMENTATION OF A HOSPITAL-WIDE PROTOCOL REDUCES TIME TO NEPHROSTOMY TUBE AND LENGTH OF STAY IN PATIENTS WITH STONE RELATED **OBSTRUCTIVE PYELONEPHRITIS**



TABLE 1

Patient characteristics and outcomes pre- and post- implementation of OPN protocol

	Pre-protocol				Pre vs Post- protocol			Post-Protocol			
Parameter	RUS	PCN	Total	p value	RUS	PCN	Total	RUS	PCN	Total	p value
Count	44 (72%)	17 (28%)	61 (100%)					50 (58%)	36 (42%)	86 (100%)	
Female sex	33 (75%)	11 (65%)	44 (72%)	0.421	0.743	0.658	0.451	36 (72%)	21 (58%)	57 (66%)	0.186
Age, mean ± SD	52.6 ± 18	64.4 ± 14	55.9 ± 18	0.019	0.53	0.325	0.56	50.2 ± 18	59.5 ± 18	54.1 ± 18	0.022
CCI, mean ± SD	2.1 ± 2.6	4.7 ± 2.6	2.8 ± 2.8	0.002	0.473	0.032	0.175	1.8 ± 2.1	2.9 ± 2.8	2.2 ± 2.5	0.046
Tmax, mean ± SD	38.3 ± 1	37.9 ± 1.7	38.2 ± 1.2	0.232	0.554	0.328	0.363	38.4 ± 0.9	38.3 ± 1	38.4 ± 0.9	0.434
min SBP, mean ± SD	108 ± 22	90 ±16	103 ± 22	0.004	0.81	0.07	0.449	111 ± 26	102 ± 26	108 ± 26	0.144
WBC, mean ± SD	14.6 ± 6	14.9 ± 6	14.7 ± 6	0.864	0.407	0.469	0.233	15.6 ± 6	16.3 ± 7	16 ± 6	0.590
Septic Shock (prior to decompression)	4 (9%)	8 (47%)	12 (20%)	0.001	0.138	0.037	0.989	10 (20%)	7 (19%)	17 (20%)	0.949
Urology primary (vs medicine)	31 (71%)	5 (29.4%)	36 (59%)	0.003	0.797	0.049	0.544	34 (68%)	21 (58%)	55 (64%)	0.357
≥1cm stone	7 (16%)	10 (59%)	17 (28%)	0.001	0.454	0.243	0.756	11 (22%)	15 (42%)	26 (30%)	0.050
Hydro severity, mean ± SD	1.4 ± 0.73	1.8 ± 0.81	1.5 ± 0.76	0.057	0.396	0.964	0.275	1.5 ± 0.76	1.8 ± 0.70	1.7 ± 0.75	0.072
Outcomes											
Hours from ER to decompression, median (IQR) Hours GU consult to	13 (9 - 20)	18 (11 - 28)	14 (10 - 21)	0.074	0.369	0.561	0.457	11 (8 - 18)	16 (11 - 26)	13 (8 - 21)	0.041
decompression, median (IQR) LOS s/p decompression,	4.5 (3.4 - 7.6)	9.2 (6.6 - 14)	5.4 (3.5 - 9)	0.001	0.609	0.001	0.017	4.5 (3.2 - 5.8)	4.3 (3.2 - 6.6)	4.5 (3.2 - 6.1)	0.786
median (IQR)	2.7 (1.7 - 4.6)	7.8 (4.3 - 15)	3.2 (2 - 7)	0.001	0.458	0.045	0.55	2.9 (1.9 - 4.4)	3.9 (2.7 - 8.0)	3.1 (2.2 - 5.4)	0.017
pLOS > 5d s/p decompression	6 (14%)	10 (63%)	16 (28%)	<0.001	0.511	0.047	0.702	9 (20%)	10 (32%)	19 (25%)	0.205
ICU admission	5 (11%)	11 (65%)	16 (26%)	<0.001	0.072	0.01	0.944	13 (26%)	10 (28%)	23 (27%)	0.854
Death	0	1 (6%)	1 (2%)	0.105	0.18	0.58	0.497	2 (4%)	1 (3%)	3 (4%)	0.761

FIGURE 1

Sepsis criteria (must have 2 of 4 criteria + suspected/proven infection):

- Temperature: < 36 °C or > 38.5 °C
- Tachycardia: HR > 90 bpm
- Respiratory: Mean RR > 20 or pCO₂ <32 mmHg
- WBC > 12 or < 4 k/µL or > 10% immature neutrophils

*Anatomic variations that can make retrograde access difficult and a delay in relief of obstruction can compromise patient care:

- Ileal ureter
- Urinary diversion (ileal conduit, orthotopic neobladder, continent cutaneous urinary diversion)
- Ectopic kidney
- Anomalous kidne
- Transplant kidney
- Spinal dysraphism

Patient with co-morbid factors preventing lithotomy position

**Coagulation factor must be checked prior to nephrostomy tube placement: INR < 1.5

Platelet count > 50 k/µL

agent to date, discussion should occur between IR attending, urology attending and anesthesia attending regarding risks and benefits of each approach to help hich would be safest for the patient on a case-by-case b

- hours (p = 0.002).
- receiving RUS (Table 1).
- days, p = 0.05).

decreased.

REFERENCES / FURTHER INFORMATION





Abstract #MP63-17

RESULTS

• The rate of NT utilization increased after implementation of the protocol from 4.5 NT/year to 14 NT/year with a decrease in the median time from urologic consultation to NT from 9.2 hours to 4.3

• Patients receiving NT were older and more comorbid than those

 Median length of stay was shorter for those undergoing NT after the protocol compared to before the protocol (3.9 days vs 7.8

• On multivariable analysis controlling for sex, Charlson

Comorbidity Score, and septic shock, hours to decompression increased odds of prolonged LOS (OR 1.09, p = 0.007).

CONCLUSIONS

• After implementing our OPN with sepsis protocol, NT utilization increased, time to decompression with NT decreased, and LOS

• Timely decompression reduced odds of prolonged hospital stay. • A well-designed protocol engages both urology and IR in the management of these acutely ill patients, expediting decompression and improving outcomes.

. Borofsky MS, et al. Surgical decompression is associated with decreased mortality in patients with sepsis and ureteral calculi. J Urol. 2013;189:946-951. 2. Gorelov S, et al. The choice of urinary drainage in patients with ureteral calculi of solitary kidneys. Arch Ital Urol Androl. 2004. June;76(2):56–8.

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