| Missing Percentage (%) |        |
|------------------------|--------|
| Age                    | 0      |
| Sex                    | 0      |
| Previous Stone History | 9.0    |
| Stone.size.categories  | 0      |
| Side                   | 0      |
| Stone.Position.Categories | 0   |
| WBC count              | 0      |
| Neutrophil count       | 5.0    |
| CRP                    | 26.0   |
| Creatinine             | 3.0    |
| Hydronephrosis         | 7.0    |
| Hydroureter            | 15.0   |
| Perinephric Stranding  | 31.0   |
| Urine Dip_Blood        | 18.0   |
| Urine Dip_Leucocytes   | 23.0   |
| Urine Dip_Nitrites     | 25.0   |
| Respiratory Rate       | 15.0   |
| Heart Rate             | 14.0   |
| NSAID Given            | 18.0   |
| MET                    | 13.0   |

**Supplementary Table 1:** Table with percentage of missing values
| Variable               | Corrected OR | Corrected lower 95%CI | Corrected upper 95%CI | p-value |
|------------------------|--------------|-----------------------|-----------------------|---------|
| intercept              | 5.27         | 3.34                  | 8.32                  |         |
| Male                   | 0.71         | 0.54                  | 0.93                  | 0.01    |
| Neutrophils            | 1.03         | 1                     | 1.07                  | 0.06    |
| Hydronephrosis         | 0.79         | 0.55                  | 1.12                  | 0.18    |
| Hydroureter            | 1.5          | 1.03                  | 2.18                  | 0.04    |
| Stone size >5-7mm      | 0.17         | 0.13                  | 0.23                  | <0.001  |
| Stone size >7mm        | 0.13         | 0.09                  | 0.2                   | <0.001  |
| Middle ureter          | 0.68         | 0.46                  | 0.99                  | 0.05    |
| upper ureter           | 0.34         | 0.26                  | 0.45                  | <0.001  |
| NSAID oral             | 1.29         | 0.91                  | 1.81                  | 0.15    |
| NSAID rectal           | 1.19         | 0.86                  | 1.64                  | 0.29    |
| MET                    | 1.26         | 0.97                  | 1.64                  | 0.08    |

**Supplementary Table 2:** Multivariable analysis corrected in development set
Supplementary Figure 1: Proportion of patients with spontaneous stone passage (SSP) according to year of patient presentation. A non-significant estimated annual percentage change (EAPC) of -7.93% in proportion of patients with SSP was observed (p=0.26) between 2013-2017. Only a small number of patients were from end 2013 and early 2017, hence were grouped with 2014 and 2016 respectively. Majority of participants (61%) were included from 2015. The Rcan package was used for the calculation of EAPC.
Supplementary Figure 2: Risk calculator interface (website version). Available at

https://www.bursturology.com/Studies/Mimic/Calculator/calc/
Supplementary Figure 3: Decision curve analysis for SSP: (a) Net benefit of the MIMIC SSP model use is represented by the dashed line against a range of threshold probabilities. Net benefit is depicted for the model (dashed line) against an intervention for all strategy (solid grey line) and intervention in none strategy (solid black line). The threshold probability corresponds to the likelihood of SSP predicted by the model. (b) Net reduction in intervention per 100 patients for ureteric calculi against a range of threshold probabilities.