

The START (Surgical Triage And Resource Allocation Tool) of Surgical Prioritization During the COVID-19 Pandemic



To the Editor: Guidelines on deferring surgeries during the COVID-19 pandemic have been based primarily on disease urgency, without addressing resource allocation specifically.¹⁻⁵ We highlight resource stewardship issues, and share an *easily administered* and *highly adaptable* tool for surgical prioritization depending on *surgical acuity* and *resource utilization*, 2 key determinants of resource allocation in a pandemic.

RESOURCE STEWARDSHIP DURING A PANDEMIC

It is imperative that surgeons consider broader resource utilization and allocation, beyond individual patients' needs. Doctors are trained to consider disease severity as the most important factor in prioritizing treatment. Yet, in a pandemic, considering overall resource utilization is *essential*.

Each country exists at different timepoints on their pandemic curves. Blanket recommendations for postponing all elective surgeries would be relevant in resource-scarce states, but inefficient in resource-sufficient states. Dynamic *resource allocation decision-making is necessary*.

The COVID-19 pandemic would likely be prolonged, with unpredictable waves of infection. Hospitals need to balance risks of overloading current capacity, vs the inevitable backlog of deferred cases. Mismanagement of demand and supply would lead to unsustainable deferment of services, excessive built-up demand, causing an *overly protracted recovery*.

OVERVIEW OF THE SURGICAL TRIAGE AND RESOURCE ALLOCATION TOOL (START)

START is an *easily administered* and *highly adaptable* tool for surgical prioritization, developed by our tertiary academic center. The START Score is derived from the Surgical Triage (ST) and Resource Utilization (RU) Scores of each case (Table 1).

The ST Score is dependent on an intuitive color-coded 5-tier system (Life-threatening/Emergency, Oncologically/Organ-Threatening Urgent, Oncologically/Organ-threatening Semiurgent, Elective, and Nonessential). We classified Urology surgeries (Table 1) based on consensus

opinion from an expert panel of subspecialists. The ST Score was designed to be incremental (Score = 2ⁿ), to ensure cases in each Tier will not have a higher final START score (and lower priority) than the following less-acute Tier, unless the surgery would be highly resource-intensive with all 4 key resources utilized. As Life-threatening cases were intentionally assigned a score of 0, the START score of all emergency cases would be 0, indicating the default highest priority, regardless of the RU score.

The RU Score is determined by 4 hospital resources that are scarce in the COVID-19 pandemic. These were the need for Intensive/High-Dependency Care, hospital stay >2-days, involvement of other medical/surgical disciplines, and blood transfusions. For every resource consumed, a cumulative score is derived by multiplying the multiplication factors which applies.

The ST score is multiplied by the RU score to calculate the final START score. START scores range from 0 to 16.3. Lower START scores indicate *more urgent* and *less resource* intense cases, which should be accorded higher priorities. START proved effective with table-top-exercises based on different scenarios. Its ease of administration reduces stress associated with complex decision-making during the pandemic. It is also highly applicable to other surgical disciplines. With any given amount of resources, and as local pandemic situations change, surgeons can prioritize surgeries based on START scores. It is our hope that sharing this easily administered tool would enable Urologists worldwide to dynamically prioritize surgeries, tailored to their local prevailing pandemic circumstances.

AUTHORS' CONTRIBUTIONS

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Table 1. The Surgical Triage and Resource Utilization Tool (START) and Suggested Classification of Urological Procedures

Surgical Triage Score	Resource Utilization Score (× Multiplication Factor)		START Score		
Life-threatening/ Emergency (0 points)	Need for Intensive Care or High Dependency Unit care (× 1.4 points)		Calculated START Score: _____		
Organ-threatening or Oncologically Urgent (1 point)	Need for hospital stay > 2 days (× 1.2 points)		<u>Examples</u> for illustration (lower START scores represent a combination of more urgent cases and less resources consumed)		
Organ-threatening or Oncologically Semiurgent (2 points)	Need for involvement of other medical or surgical disciplines (× 1.1 points)		<ul style="list-style-type: none"> Laparotomy and Nephrectomy for Major Trauma requiring ICU care, prolonged hospital stay, multi-disciplinary surgical involvement, blood transfusions - $0 \times (1.4 \times 1.2 \times 1.1 \times 1.1 \text{ points}) = \text{START Score } 0$ Radical Cystectomy for MIBC requiring HDU care and prolonged hospital stay - $1 \times (1.4 \times 1.2 \text{ points}) = \text{START Score } 1.68$ Radical Nephrectomy for RCC with IVC thrombus requiring ICU care, prolonged hospital stay, cardiothoracic surgery involvement and blood transfusions - $1 \times (1.4 \times 1.2 \times 1.1 \times 1.1 \text{ points}) = \text{START Score } 2.03$ Diagnostic Ureteroscopy for suspected high-grade UTUC as a day surgery case with no other resources utilized - $2 \times (1.0 \text{ point}) = \text{START Score } 2.00$ 		
Elective procedures (4 points)	Need for blood transfusions (× 1.1 points)				
Nonessential procedures (8 points)	None of the above (× 1.0 point)				
Surgical Triage Score	Life-threatening/ Emergency	Organ-threatening or Oncologically Urgent	Organ-threatening or Oncologically Semiurgent	Elective procedures	Nonessential procedures
ONCOLOGY					
Prostate cancer			Radical Prostatectomy for high risk prostate cancer	Radical Prostatectomy for intermediate risk prostate cancer Radiation therapy procedures (ADT can be given with deferred RT)	Orchidectomy for surgical castration Procedures for treatment of low risk prostate cancer
Bladder cancer		Radical Cystectomy for MIBC TURBT for high risk/symptomatic NMIBC or MIBC as part of bladder sparing protocol	Radical Cystectomy for high risk/recurrent NMIBC	Bladder biopsies/TURBT for low-risk lesions Surveillance cystoscopy for high and intermediate NMIBC	Surveillance cystoscopy for low risk NMIBC

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Table 1. Continued

Surgical Triage Score		Resource Utilization Score (× Multiplication Factor)	START Score		
Upper tract urothelial carcinoma		Nephroureterectomy for high risk or symptomatic UTUC	Diagnostic Procedures for high risk UTUC	Diagnostic and Therapeutic Procedures for low risk UTUC	
Renal cell carcinoma	Laparotomy for ruptured RCC with hemodynamic instability	Radical Nephrectomy for RCC with IVC thrombus or symptomatic RCC	Radical Nephrectomy for T2-T4 RCC	Partial/Radical Nephrectomy for RCC or SRM >4cm, or progression on imaging	Partial Nephrectomy and Ablative Therapies for stable Small Renal Masses
Adrenal tumors		Adrenalectomy for suspected adrenocortical cancer (>6cm)	Adrenalectomy for functioning adenomas with failed medical therapy, suspected cancer <6cm		Adrenalectomy for functioning adenomas controlled by medical therapy
Testicular cancer		Radical Orchiectomy for Testicular cancer	RPLND postchemotherapy or primary RPLND	RPLND postchemotherapy for suspected slow growing teratoma	Insertion of testicular implant
Penile cancer		Penectomy for Penile cancer	Biopsy for suspected Penile cancer		
ENDO-UROLOGY					
Hematuria	Cystodiathermy for intractable lower tract bleeding		Cystoscopy for evaluation of hematuria with abnormal imaging findings	Cystoscopy for evaluation of gross hematuria without abnormal imaging findings	Cystoscopy for evaluation of microscopic hematuria
Lower tract urinary obstruction	SPC insertion or Cystoscopy for catheter insertion with failure to insert catheter per urethra				Cystoscopy for evaluation of stable/chronic obstructive LUTS
Urethral stricture					Procedures for urethral strictures if diversion has been achieved
Benign prostatic enlargement					Transurethral Resection of Prostate and other related procedures for BPE
Upper tract urinary obstruction	Ureteric stenting or nephrostomy tube insertion for infected hydronephrosis, solitary functioning kidney or bilateral obstruction	Ureteric stenting or nephrostomy tube insertion for symptomatic/high-grade obstruction	Ureteric stenting or nephrostomy tube insertion for obstruction without infection or symptoms	Regular change of long-term ureteric stent	Definitive procedures for stable ureteric strictures with existing diversion, eg, ureteric stents
UROLITHIASIS					
Ureteric calculi	Ureteric stenting or nephrostomy tube insertion for infected hydronephrosis Ureteric stenting or nephrostomy tube insertion for solitary functioning kidney or bilateral calculi	Ureteric stenting or nephrostomy tube insertion for symptomatic/high-grade obstruction	Therapeutic ureteroscopy for obstructing ureteric calculus with hydronephrosis Ureteric stenting or nephrostomy with deferred ESWL/ ureteroscopy for obstructing ureteric calculus with hydronephrosis	Therapeutic ureteroscopy or ESWL for ureteric calculus with no hydronephrosis or when urinary diversion for obstruction has been achieved	
Renal calculi			Procedures for staghorn calculi with obstruction	Procedures for symptomatic calculus without obstruction	Procedures for asymptomatic calculus
Bladder calculi				Procedures for bladder calculi with recurrent obstruction or infection	Procedures for asymptomatic bladder calculi
Urethral calculi	Cystoscopy for calculus with urinary obstruction				
KIDNEY TRANSPLANT AND DIALYSIS ACCESS					
Kidney transplant			Deceased Donor Transplant		Living Donor Transplant
Transplanted kidney management	Graft nephrectomy for fulminant graft sepsis		Lymphocele drainage procedures for symptomatic lymphoceles		Graft nephrectomy for chronic graft failure
Dialysis access			Peritoneal dialysis catheter removal for peritonitis		Peritoneal dialysis catheter removal
			Peritoneal dialysis catheter insertion		Vascular access surgeries

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Table 1. Continued

Surgical Triage Score		Resource Utilization Score (× Multiplication Factor)	START Score	
MISCELLANEOUS CONDITIONS				
Urogenital trauma	Procedures for patients with hemodynamic instability		Procedures to salvage organ function	Post trauma reconstructive surgery
Infections	Ureteric stenting or nephrostomy tube insertion for infected hydronephrosis Wound debridement for Fournier's Gangrene Drainage of abscesses in septic patients		Drainage of abscesses in nonseptic patients	Repair of urogenital fistulas with recurrent infections
Testicular/scrotal disorders		Scrotal exploration for suspected testicular torsion	Excision of cutaneous malignancy	Scrotal exploration for suspected intermittent torsion Orchidopexy for undescended testes
Penile disorders			Penile Exploration for Penile Fracture Shunt procedures for Priapism Removal of infected penile prosthesis Excision of cutaneous malignancy	Circumcision for BXO Procedures for Peyronie's Disease Penile implants Circumcision for phimosis/social reasons Excision of benign skin lesions
Fertility and contraception procedures				Diagnostic and therapeutic fertility procedures Vasectomy
Functional urology/incontinence				Intravesical Botox for OAB Continence surgeries, eg, slings, AUS, TVT Urogenital prolapse surgeries

References

1. Goldman HB, Haber GP. Recommendations for tiered stratification of urologic surgery urgency in the COVID-19 Era. *J Urol*. 2020; Apr 21:101097jU000000000000001067.
2. Stensland KD, Morgan TM, Moizadeh A, et al. Considerations in the triage of urologic surgeries during the COVID-19 pandemic. *Eur Urol*. 2020;77:663–666. <https://doi.org/10.1016/j.eururo.2020.03.027>.
3. Ficarra V, Novara G, Abate A, et al. Urology practice during COVID-19 pandemic. *Minerva Urol Nefrol*. 2020. <https://doi.org/10.23736/S0393-2249.20.03846-1>.
4. Rihal MJ, Cornford P, Briganti A, et al. European Association of Urology Guidelines Office Rapid Reaction Group: an organisation-wide collaborative effort to adapt the European Association of Urology guidelines recommendations to the coronavirus disease 2019 era. *Eur Urol*. 2020. <https://doi.org/10.1016/j.eururo.2020.04.056>.
5. Urological Society of Australia and New Zealand. Urological prioritisation during COVID-19. 2020. Accessed date: 15 May 2020. Available at: <https://usanz.org.au/publicassets/3ff1dd5-546e-ea11-90fb-0050568796d8/Pol-020-Guidelines-Urol-Prioritisation-During-COVID-19-25-3-2020.pdf>.