

Non-Elective Surgery Triage (NEST) Classification: Validation on an Acute Care Surgery Service

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Category: PI

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What is the problem or challenge you identified?

Patients requiring emergency surgery represent a challenge to appropriately prioritize, especially with limited resources. An initiative on Timing of Acute Care Surgery classification (TACS) was undertaken by the World Society of Emergency Surgery (WSES) study group in 2013, proposing ideal times to surgery in an attempt to standardize timing of interventions in surgical emergencies.^{1, 2} However, implementation of protocols for appropriate triage of multiple surgical emergencies with evidence based data is lacking. At our institution (Hurley Medical Center) we identified a number of patients requiring an appendectomy that have been delayed to operation with associated morbidity. The delay was attributed to the presence of other surgical patients that were presumably determined to require earlier intervention. Upon review of the OR boarding process, a categorization system to identify levels of acute surgery existed, however, it was not based on urgency or physiology; its origin was unknown, was not fully functional and had discrepancies between different surgical disciplines. The OR was functioning more on the basis of 'first comes first served'. We recognized the need to develop a more functional and robust system.

Describe the intervention you developed/change you implemented to address the problem:

The Timing of Acute Care Surgery classification (TACS) was modified to develop the Non-elective Surgery Triage (NEST) classification system; a six-level grid that categorizes patients requiring acute surgery into emergent, urgent or semi-urgent (Table 1). It allows prioritization of patients requiring acute care surgery based on physiologic state and disease process. NEST is a performance improvement tool for improving patient safety, quality of care, and efficiency in the boarding of surgical patients for operative care.

How did you measure the effects of the change?

A pilot project was conducted at Hurley Medical Center from December 1, 2014 to December 30, 2014 utilizing the NEST classification system. Included were all trauma and non-elective surgery patients requiring operative intervention that were cared for by the Trauma Department. No interventions were undertaken based on the NEST criteria and the project was carried out to assess feasibility. Time from decision to require surgery until the operation was tabulated and a Time To Surgery (TTS) index was utilized to identify patients that met the NEST goal (Figure A). Results are shown in Table 2.

How did you sustain the change?

Multiple meetings with the various surgical disciplines are currently being held to provide education, obtain 'buy in' and facilitate the re-allocation of operative rooms and prioritization of surgical patients from different disciplines based on the NEST criteria. Upon completion, the project will continue for one year and be evaluated for its effectiveness and impact on outcomes. If success is encountered and outcomes improve, it will be moved into the standard operations mode.

References

¹Kluger et al.: World society of emergency surgery study group initiative on Timing of Acute Care Surgery classification (TACS). World Journal of Emergency Surgery 2013 8:17.

²Wanis et al.: Impact of an acute care surgery service on timeliness of care and surgeon satisfaction at a Canadian academic hospital: a retrospective study. World Journal of Emergency Surgery 2014 9:4.

Category	Ideal Time To Surgery (iTTs) <i>FROM: decision to operate TO: incision in OR</i>	Possible clinical scenario	Non- Elective Surgery Triage (NEST) level	Notes
Emergency	<i>Immediate (within minutes) 'Break-in' to existing lists if required</i>	Hemodynamic instability , for example: - Bleeding traumatic emergencies - GSW to the chest or abdomen	NEST 1	Immediate life-saving surgical intervention. Resuscitation simultaneous with surgical treatment. Life loss is imminent
	<i>Within an hour</i>	Viscus perforation, vascular compromise, sepsis , for example: - Limb ischemia - Diffuse peritonitis - Soft tissue infection with sepsis - Abdominal compartment syndrome	NEST 2	Surgical intervention as soon as possible AFTER initial resuscitation. Limb, organ or tissue loss is imminent.
Urgent	<i>Within 4 hours</i>	- Extremity compartment syndrome - Ascending cholangitis - Incarcerated hernia - Craniotomies/-ectomies	NEST 3	
	<i>Within 12 hours</i>	- Bowel obstruction - Localized peritonitis or soft tissue infection in need of surgery: a) Appendicitis b) Abscess <u>not</u> accompanied with sepsis - Open fractures	NEST 4	Repeat examinations while waiting for surgery
Semi-urgent	<i>Within 48 hours</i>	- Second look laparotomy - Acute cholecystitis	NEST 5	Schedule in advance
	<i>Within 72 hours</i>	1 st debridement of burn cases	NEST 6	Schedule in advance

NEST LEVEL	TOTAL NUMBER OF PATIENTS (%)	IDEAL TIME	RANGE	AVERAGE ACTUAL TIME	MET Target		Target NOT MET		
					Number of Patients (%)	Average TTS Index (Ideal <1)	Number of Patients (%)	Average TTS Index (Ideal <1)	Clinical Scenarios
1	6 patients (10%)	Within minutes	8 min - 40 min	28 min.	1 Patient (17%)	0.8	5 Patients (83%)	3.16	1. GSW Abdomen- Ex. Lap (40min.) 2. Stab Abdomen- Ex. Lap (30min.) 3. Per. Tamponade- P. Window (33min.) 4. GSW neck - Neck explor. (32 min.) 5. Multiple wrist lac. (arterial bleed) – Wrist exploration (23 min.)
2	7 patients (12%)	With 1 hour	31 min - 2 hrs 44 min.	1 hr 11 min.	4 Patients (57%)	0.7	3 Patients (43%)	1.9	1. Gang. Nec. Toe - Amp. (1 hr 25min.) 2. MVC, blunt abd. Trauma - Diag. lap. (1 hr 25min.) 3. Perf. Viscus - Ex. Lap. (2hr 44min.)
3	4 Patients (7%)	Within 4 hours	55 min. - 3 hrs 47 min.	2 hrs. 8 min.	4 Patients (100%)	0.5	N/A	N/A	N/A
4	29 Patients (49%)	Within 12 hours	49 min. - 19 hrs 17 min.	5 hrs 41 min	25 Patients (86%)	0.3	4 Patients (14%)	1.4	1. LT foot abscess - I & D (17 hrs 39min.) 2. RT hip abscess - I & D (16 hrs 2min.) 3. Perirectal abscess - I & D (13hrs 42 min.) 4. Appendicitis - Dx. Lap. (19 hrs 17min.)
5	7 patients (12%)	Within 48 hrs	1 hr 4min. - 37 hrs	15 hrs 10 min.	7 Patients (100%)	0.3	N/A	N/A	N/A
6	5 Patients (8%)	Within 72 hrs	4 hrs 33min. - 41 hrs 56 min.	19 hrs 58 min.	5 Patients (100%)	0.3	N/A	N/A	N/A

Quality improvement tool

actual Time to Surgery (aTTS)

ideal Time to Surgery (iTTS)

A ratio of <1 meets the target.