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INTRODUCTION

The World Health Organization (WHO) surgical safety checklist is a widely applied tool in surgical practice aimed at identifying potential faults before they can culminate into harm to patients. Its use has led to decrease in peri-operative errors and adverse events and promoted an increase in teamwork and communication in surgery worldwide. However the generic WHO checklist does not take into account certain considerations unique to sub-groups of surgical patients like burns. Burn patients have complex peri-operative requirements including potential use of skin substitutes, specialist equipment, large volumes of blood products and a greater requirement for pre-operative optimisation. Therefore a modified burn-specific checklist may be of value.

AIM: 1) To adapt the generic WHO surgical safety checklist into a burn-specific surgical checklist.
2) To undertake a recruitment exercise to engage as many burns services as possible to develop the concept.

METHODOLOGY

1. Initial dialogue between a small number of burns services to develop a proof-of-concept burn-specific checklist.
2. Present a 'version zero' burn specific theatre checklist.
3. Engage with more burns services with a view to using a modified Delphi methodology to establish a working group to develop a version 1 burn-specific theatre checklist.

Version 0 Burn theatre checklist: DAY OF SURGERY

St Helens and Knowsley Teaching Hospitals NHS Trust	
THEATRE CHECK - BURNS SAFETY FORM	
PATIENT DETAILS	
NAME: _____	
DOB: _____	
HOSPITAL NUMBER: _____	
NHS NUMBER: _____	
PROCEDURE: _____	
<i>(If NHS number unavailable, acquire temporary one)</i>	
WHO SIGN IN <i>Anaesthetic room - before intervention</i>	
Confirm patient ID, procedure, consent?	
1: YES <input type="checkbox"/> NO <input type="checkbox"/>	
2: Site marks & donor area confirmed?	
2: YES <input type="checkbox"/> NO <input type="checkbox"/>	
3: Patient ALLERGY status?	
YES <input type="checkbox"/> Unknown <input type="checkbox"/> NKDA <input type="checkbox"/>	
4: Difficult airway	
4: YES <input type="checkbox"/> NO <input type="checkbox"/>	
5: Infection Status known?	
5: YES <input type="checkbox"/> NO <input type="checkbox"/>	
6: Blood products required?	
6: YES <input type="checkbox"/> NO <input type="checkbox"/>	
WHO TIME OUT <i>Theatre - prior to prepping and draping</i>	
Surgical Site Infection & Patient Care Bundle	
Have a silent focus, demand team attention	Is the patient position optimised? YES <input type="checkbox"/> NO <input type="checkbox"/>
Confirm all team members names and roles <i>Document all personnel on whiteboard</i>	Will position changes be required? YES <input type="checkbox"/> NO <input type="checkbox"/>
1: YES <input type="checkbox"/> NO <input type="checkbox"/>	3: Antibiotics given in last hour? YES <input type="checkbox"/> NO <input type="checkbox"/>
Confirm patient ID procedure, consent, ALLERGY status?	Hair Removal needed? YES <input type="checkbox"/> NO <input type="checkbox"/>
YES <input type="checkbox"/> NO <input type="checkbox"/> Unknown <input type="checkbox"/>	Glycaemic Control optimised? YES <input type="checkbox"/> NO <input type="checkbox"/>
	Has VTE prophylaxis been optimised? YES <input type="checkbox"/> NO <input type="checkbox"/>
Surgical Demands	
Anaesthetic Demands	Allgraft team needed? YES <input type="checkbox"/> NO <input type="checkbox"/>
Are there any patient concerns? YES <input type="checkbox"/> NO <input type="checkbox"/>	Autograft Mesh 1:1 <input type="checkbox"/> 1.5:1 <input type="checkbox"/> 2:1 <input type="checkbox"/> 3:1 <input type="checkbox"/> 4:1 <input type="checkbox"/>
2: Patient temperature optimised? YES <input type="checkbox"/> NO <input type="checkbox"/>	4: Meek Mesh 3:1 <input type="checkbox"/> 4:1 <input type="checkbox"/> 6:1 <input type="checkbox"/> 9:1 <input type="checkbox"/>
ASA grade? 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/>	Post-debridement swabs required? YES <input type="checkbox"/> NO <input type="checkbox"/>
Has Tranexamic Acid been given? YES <input type="checkbox"/> NO <input type="checkbox"/>	All essential imaging displayed? YES <input type="checkbox"/> NO <input type="checkbox"/>
	Sterility of equipment confirmed? YES <input type="checkbox"/> NO <input type="checkbox"/>
WHO SIGN OUT <i>Theatre - end of procedure</i>	
4: Procedure recorded? YES <input type="checkbox"/> NO <input type="checkbox"/>	6: Post-operative analgesia prescribed? YES <input type="checkbox"/> NO <input type="checkbox"/>
2: Surgical count correct? YES <input type="checkbox"/> NO <input type="checkbox"/>	7: Post-operative positioning aids needed? YES <input type="checkbox"/> NO <input type="checkbox"/>
3: Specimens recorded/labelled? YES <input type="checkbox"/> NO <input type="checkbox"/>	8: Patient pressure areas checked? YES <input type="checkbox"/> NO <input type="checkbox"/>
4: Any equipment problems? YES <input type="checkbox"/> NO <input type="checkbox"/>	9: Any anaesthetic or surgical concerns? YES <input type="checkbox"/> NO <input type="checkbox"/>
5: Any allograft to be returned? YES <input type="checkbox"/> NO <input type="checkbox"/>	

Burn-specific parameters over and above the generic checklist include:

SIGN IN: Before induction of anaesthesia

- a. Theatre pre-warming (including checks of overhead heaters)
- b. Confirmation of graft donor site with patient (if awake)
- c. Confirm allograft has arrived

TIME OUT: Before start of surgical intervention

- a. Shaving of graft donor
- b. Patient position and planning for position changes
- c. Allograft preparation
- d. Meek/mesher preparation
- e. Preparation of Local Anaesthetic/ Adrenaline infiltration

SIGN OUT: Immediately post-operatively

- a. Post-operative positioning & splintage
- b. Post-operative warming
- c. Unused allograft to be returned

Version 0 Burn theatre checklist : DAY BEFORE SURGERY

1 FIRST SAFETY CHECK DAY BEFORE OPERATION <i>12hr before theatre</i>		2 SECOND SAFETY CHECK DAY 2 <i>Day of surgery</i>	
1: High risk infectious status? (HIV/HEP/COVID) YES <input type="checkbox"/> NO <input type="checkbox"/>	13: Vasopressor or inotropic requirement stable? YES <input type="checkbox"/> NO <input type="checkbox"/>	1: Is the patient still fit for surgery? YES <input type="checkbox"/> NO <input type="checkbox"/> If yes complete 1 - 5	1: Is the mean arterial pressure still >65 mm/Hg? YES <input type="checkbox"/> NO <input type="checkbox"/>
2: Has patient been consented for theatre? YES <input type="checkbox"/> NO <input type="checkbox"/>	14: Is Hb \geq 10g/dL? YES <input type="checkbox"/> NO <input type="checkbox"/>	2: Has euvolaemia been achieved? (Consider CVP, LIDCO, PICCO, Echo to assess fluid management):- YES <input type="checkbox"/> NO <input type="checkbox"/>	2: CVP still greater than 5? (However if PEEP is present, aim for CVP of 5 plus half the value of PEEP):- YES <input type="checkbox"/> NO <input type="checkbox"/>
3: Has patient been booked for theatre? YES <input type="checkbox"/> NO <input type="checkbox"/>	15: Are platelets 100,000/ml or greater? YES <input type="checkbox"/> NO <input type="checkbox"/>	3: Is urine output still >1ml per/kg? YES <input type="checkbox"/> NO <input type="checkbox"/>	3: Are the patient's observation's still stable? YES <input type="checkbox"/> NO <input type="checkbox"/>
4: Has patient selected preferred donor site State site: YES <input type="checkbox"/> NO <input type="checkbox"/>	16: Has the patient been cross-matched? YES <input type="checkbox"/> NO <input type="checkbox"/>	IF A NO - GET A SENIOR REVIEW	
5: If intubated- Has surgery been discussed with patient's next of kin? YES <input type="checkbox"/> NO <input type="checkbox"/>	17: INR <1.5? YES <input type="checkbox"/> NO <input type="checkbox"/>	WARD & ICU THEATRE BURNS SAFETY FORM	
6: Has cadaveric allograft skin been requested? YES <input type="checkbox"/> NO <input type="checkbox"/> N/A <input type="checkbox"/>	18: Potassium K+ between 4 and 5.5 mmol/L? YES <input type="checkbox"/> NO <input type="checkbox"/>	PATIENT DETAILS	
7: Specific biological dressings requested and available? Type of dressing: YES <input type="checkbox"/> NO <input type="checkbox"/> N/A <input type="checkbox"/>	19: Is urea \leq 10mmol/L? YES <input type="checkbox"/> NO <input type="checkbox"/>	NAME: _____	
8: Is a pre-operative anaesthetic assessment required? YES <input type="checkbox"/> NO <input type="checkbox"/> If yes complete 9 - 14	20: Is ECG required? YES <input type="checkbox"/> NO <input type="checkbox"/>	DOB: _____	
9: Is the mean arterial pressure >65 mm/Hg? YES <input type="checkbox"/> NO <input type="checkbox"/>	21: Is the patient suitable for pre-operative warming? YES <input type="checkbox"/> NO <input type="checkbox"/>	HOSPITAL NUMBER: _____	
10: Has euvolaemia been achieved? (CVP, LIDCO, PICCO, Echo to assess fluid management):- YES <input type="checkbox"/> NO <input type="checkbox"/>		NHS NUMBER: _____	
11: CVP greater than 5? (If PEEP present, aim for CVP 5 + half value of PEEP):- YES <input type="checkbox"/> NO <input type="checkbox"/>		PROCEDURE: _____	
12: Is urine output >1ml per/kg? YES <input type="checkbox"/> NO <input type="checkbox"/>		<i>(If NHS number unavailable, acquire temporary one)</i>	

Day before surgery

There is potential benefit of starting the checklist the day before surgery. This may facilitate pre-optimisation before theatre and streamline logistics such as quantity of allograft required, special investigations etc

The checklist on the day before surgery would include:

- a. Ordering of allograft / skin substitutes
- b. Cross-matching of various blood components
- c. Discussion of preferred donor sites

d. Investigations and pre-optimising patients for theatre including an anaesthetic assessment

- e. Pre-operative microbiology discussion and prophylaxis
- f. Operating list order relevant to patient infection status (MRSA/CPE/COVID)
- g. Arrangements for medical photography
- h. Interpreter requirement for consent /confirmation of capacity

??Others for discussion

CONCLUSIONS

The burn-specific theatre checklist would start the day before surgery and would potentially aid appropriate pre-operative optimisation of patients and streamline care. It has the potential to improve surgical safety, the efficiency of theatre utilisation and time management, reduce the incidence of cross-infection, as well as improve communication.

We are actively seeking to recruit burn professionals from the full spectrum of the burn MDT to participate in a working group that would meet and develop this concept further. Please contact us if you would like to participate! Email Kayvan.Shokrollahi@sthk.nhs.uk

BURNS SERVICES CURRENTLY RECRUITED: Mid Yorkshire Hospitals NHS Trust, Queen Victoria Hospital NHS Foundation Trust, Nottingham University Hospital NHS Trust

REFERENCES

1. Pugel AE, Simlanu VV, Flum DR, Patchen Dellinger E. Use of the surgical safety checklist to improve communication and reduce complications. J Infect Public Health. 2015 May-Jun;8(3):219-25. doi: 10.1016/j.jiph.2015.01.001. Epub 2015 Feb 26. PMID: 25731674; PMCID: PMC4417373.
2. Cusley C, Knight T, Murray H, Kidd L. Writing's on the wall: Improving the WHO Surgical Safety Checklist. BMJ Open Qual. 2021 Jan;10(1):e001086. doi: 10.1136/bmjopen-2020-001086. PMID: 33452183; PMCID: PMC7813408.