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Original Research Article

A tertiary care centre experience of modified early warning score (MEWS) in post-operative patients

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ABSTRACT

Background: The aim of the study is to analyse and implement the modified early warning score (MEWS) in assessment of need of early intervention and surgical intensive care unit (SICU) admission in patients undergoing elective and emergency major surgical procedures.
Methods: This prospective study was done in Coimbatore Medical College and Hospital, Coimbatore, Tamil Nadu. It included 150 patients who underwent major emergency and elective surgical procedures under regional or general anaesthesia with monitoring of physiological parameters in the P.O period.
Results: The predictability of MEWS system was analyzed with the following results: MEWS 1=77 patients were alive (51.3%) of the study population. MEWS 8=3 patients were alive (2.1%) and 7 patients died (100%) of the study population. This indicates that the greater MEWS the mortality of the patient rises, and the lesser MEWS score the chances of mortality in the P.O period is very minimal. In our study, we have derived that MEWS score of 7 or 8 implicates the need for SICU admission and it indicates an increased mortality of the patient in the P.O period.
Conclusions: The Modified Early Warning Score (MEWS) is an effective tool in identifying the early deterioration of the patients undergoing major surgical procedures and assessing the need for admission in SICU for further interventions.

Keywords: Modified early warning score, Major procedure, SICU, P.O period

INTRODUCTION

The field of surgery is continually evolving with newer modalities of surgical procedures and changing concepts about diseases. Our goal should be limiting morbidity in elective surgery and reducing mortality in emergency surgery. There are various scoring systems in detecting the P.O mortality and morbidity in patients undergoing major invasive surgical procedures.

Many scoring systems have been developed using various clinical parameters such as pulse rate, BP, RR, temperature, level of consciousness and urine output which can be easily interpreted and charted down by any healthcare personnel. These parameters play a vital role in assessing and interpreting the prognosis.

Triad of "early detection, timeliness response and competency of the clinical response", is critical to defining clinical outcomes. The use of 'early warning scores' (EWS) or 'track and trigger systems', to efficiently identify and respond to patients who the clinical response to the acutely ill P.O patients could be substantially improved by the routine embedding of

simple systems based on two key requirements: a) a systematic method to measure simple physiological parameters in all patients to allow early recognition of those presenting with acute illness or who are deteriorating and b) a clear definition of the appropriate urgency and scale of the clinical response required ,tailored to the level of acute- illness severity.

Based on these simple physiological parameter measurements there are now many 'early warning scores 'or 'track and trigger systems' in use worldwide.

The development of early warning scores observation tools

Deterioration in the patient's clinical condition, was generally preceded by a period of time when the physiological status of the patient was abnormal This was evident in measurements recorded of patient's vital signs suggesting that potential adverse effects in patient outcomes could be prevented. Warning signs were often not recognized nor communicated by ward staff which lead to delays in diagnosis, treatment, or referral, resulting in increased patient morbidity, mortality and admission to intensive care units or cardiac arrests which are preventable or avoidable in postoperative patients.

MEWS or track and trigger systems using a numerical scoring system for each physiological vital sign the scores are then totaled to identify patients at risk of deterioration. These tools were introduced to improve the safety of acutely ill postoperative patients. NICE and NSPA guidelines highlighted importance of introducing these systems to recognize patient's deterioration promptly and to initiate an appropriate response.

The key themes that are described under the Modified Early Warning Scores (MEWS) are: patient safety and suboptimal care monitoring and recording Vital Signs and EWS education and training in vital signs monitoring and ews delegation and competence.

Patient safety and suboptimal care

McQuillan et al, identified that sub-optimal care of patients on general wards was directly related to increased mortality rates Furthermore their findings claim that 41% of SICU admissions could have been avoided.[1] NCEPOD 2005 highlighted the failure to recognize clinical deterioration in acute hospital setting.[2] A further enquiry in 2012 revealed that signs of clinical deterioration are often missed, misinterpreted and mismanaged.

Communication failures between teams contributed to delayed referrals. Andrews and Waterman explored how information relating to EWS and vital signs to determine and react to deterioration and found that information needs to be communicated in credible way to Doctors when relating deterioration concerns.[3] Miscommunication and non-communication were most common root causes of patients experiencing preventable and unnecessary harm. ISBAR(Identify-Situation-Background-Assessment-Recommendation) communication tool is simple way to plan and structure communication and to standardize reporting and safety checklists to improve communication.[4]

Monitoring and recording vital signs and EWS

NICE recommended that physiological observations should be Monitored every 12 hours with frequency increasing if abnormal. Hands et al found that the frequency of vital signs monitoring in hospital often appears to be inadequate.[5] There was only partial adherence to clinical protocols.

Alarmingly these findings echo Odell et al's study which found that there is no consensus on the frequency and type of monitoring that patients ought to receive which raises concern.[6]

The NPSA a report identified that HCA rarely carried out routine observations during the night and that observations are seen as tasks with a low priority. Temperature, pulse rate, B.P, oxygen saturation, urine output, level of consciousness are all routinely measured in an automated, non-invasive manner.

Abnormal R.R is an early indicator of physiological deterioration and predictor of potentially serious clinical events. The literature has identified repeated failings in the recording of vital signs. Hogan reported R.R recording was routinely missed and are documented less often than other vital signs.[7]

This is supported by Van Leuven and Mitchell who noted the frequency of documentation was significantly lower for R.R than for all other vital sign measurements.[8] Serious problems with incomplete and inaccurate recording of patient observations were highlighted in Donohue and Endacotts study.[9]

Cooper et al concur that vital signs recordings were incompletely recorded.[10] Furthermore, Endacott' set al. analysis of patients charts identified the level of consciousness was not recorded on any patient records reviewed in their study.[11]

Ludikhuize et al demonstrated that recordings of vital signs were incomplete even when the EWS was 3 or more, R.R and oxygen saturation were documented in only 30% to 66% of assessments.[12] Gaps in recording vital sign data are common but identify that the use of EWS can increase the completeness of vital sign monitoring.

HCAs should have adequate training in recording and documentation of vital signs. Little is known about the accuracy with which MEWS are calculated and charted

Prytherch and there are inaccuracies and miscalculations related to manual data collection Cuthbertson et al.[13,14]

Smith et al describe the aggregate weighted "track and trigger" systems (AWTTS) and explores their predictive ability for serious adverse outcomes.

Hence the RCP recommended the use of a national EWS in the UK which would attempt to standardise practice.[15]

Education and training in vital signs monitoring and EWS

Mandatory training, scenario-based learning, ongoing education and clinical supervision of HCAs is recommended. Education and training of all healthcare professionals in EWS has significantly increased with introduction of programme such as ALERT (Acute life-threatening events recognition and treatment) framework

Table 1: MEWS score.

Scores	3	2	1	0	1	2	3
Respiratory rate /min		≤8		9-14	15–20	21-29	>29
Heart rate/mn		<40	41-50	51-100	101-110	111-129	>129
Systolic BP (mhg)	<70	71-80	81-100	100-199		>200	
Urine output/hour (mL)	< 80	80 - 120		>120			
Oxygen supplement	yes				no		
Temperature (0C)	<35		35.1-36.0	36.1-38.0	38.1-39.0	>39.1	
neurological				Alert	Response to voice	Response to pain	unresponsive

Green:0-2; Yellow: 3; Orange: 4-5; Red: >6

Delegation and competence

The key to promoting patient safety is to ensure that HCAs are trained and competent to undertake the tasks delegated to them, and that accountability is clear. Decisions around delegation should be determined by patients' needs and interests. This study aims to analyze and interpret the P.O physiological parameters in patients undergoing elective and emergency surgical procedures into a valid scoring system known as 'modified early warning score and to determine its efficacy in detection of physiological deterioration of the patients in the P.O period (Table 1). This study also aims to determine the mortality of the patients undergoing various elective and emergency surgical procedures.

METHODS

This is a prospective cohort study done in department of general surgery, Coimbatore Medical College Hospital, a tertiary care referral centre in Tamil Nadu India. All patients who had undergone both elective and emergency surgeries from July-2015 to July-2016 in a single unit of department of surgery were included in study.

Exclusion criteria

Included patient below 18 year of age, pregnant patients and those with history of polytrauma. All the patient's data were collected, and mews scoring was done for all patients. The health care assistant, nurses and surgical team were trained in documentation of chart. MEWS (Table 1). The outcome of patients was assessed and patient who needed SICU admission was monitored for outcome.

Primary outcome

The value of scoring system like MEWS in a post-operative clinical setup in the improvement of patient's clinical condition after early goal directed therapies (EGTD). Number of patients who were discharged alive and their corresponding MEWS were also assessed.

RESULTS

The results were analysed and interpreted into the data tabular columns. The data were analysed with IBM.SPSS statistics software 23.0 Version.

To describe about the data descriptive statistics frequency analysis, percentage analysis was used for categorical variables and the mean and SD were used for continuous variables. To find the significance in categorical data Chi-Square test and Fisher's Exact was used. The Hosmer and Leme show test for goodness of fit was used to predict the observed and expected mortality with MEWS.In all the above statistical tools the probability value .05 is considered as significant level.

Age distribution

The mean age of the patients undergoing major surgical procedures was 41.31 (SD -13.591).

Sex distribution of admissions into SICU/ward

The males and females included in study were 76 and 74 respectively. number of females who were admitted in SICU and postoperative ward was 14 and 62 respectively. similarly, in males, 19 patients had SICU admissions and 55 were admitted in P.O ward (POW) (Table 2).

Table 2: Sex distribution.

Sex		SICU/WARD		Total
		S	W	
F	Count	14	62	76
	% within SICU/WARD	42.4%	53.0%	50.7%
M	Count	19	55	74
	% within SICU/WARD	57.6%	47.0%	49.3%
Total	Count	33	117	150
	% within SICU/WARD	100.0%	100.0%	100.0%

Type of anesthesia

General anesthesia and regional anesthesia were employed in 64 and 86 patients respectively.

Table 3: Types of anesthesia used.

		SICU/WARD		Total
		S	W	
Anaesthesia				
GA	Count	28	36	64
	% within SICU/WARD	84.8%	30.8%	42.7%
RA	Count	5	81	86
	% within SICU/WARD	15.2%	69.2%	57.3%
Total	Count	33	117	150
	% within SICU/WARD	100%	100%	100%

28 patients who underwent GA were admitted in SICU whereas only 5 patients of regional anesthesia group had SICU admission (Table 3).

Comorbidities

Comorbid illness absent in patients with admission to SICU are 14 and in post-operative ward are 108 with total number of patients without comorbid illnesses are 122 (81.3%). Comorbid illness present in patients with admission to SICU are 19 and in P.O ward are 9 with total number of patients with comorbid illnesses are 28 (Table 4).

Table 4: Comorbidity.

			SICU/Ward		Total
			S	W	
Comorbidity	N	Count	14	108	122
		% within SICU/Ward	42.4	92.3	81.3
	Y	Count	19	9	28
		% within SICU/Ward	57.6	7.7	18.7
Total		Count	33	117	150
		% within SICU/Ward	100.0	100.0	100.0

MEWS

MEWS 0 was found in 6 patients which accounts for 4% of the study population. MEWS of 1 was found in 77 patients which accounts for 51.3% of the study population.

Table 5: MEWS scoring.

		SICU/Ward		Total
		S	W	
MEWS				
0	Count	0	6	6
	% within SICU/Ward	0.0	5.1	4.0
1	Count	0	77	77
	% within SICU/Ward	0.0	65.8	51.3
2	Count	0	31	31
	% within SICU/Ward	0	26.5	20.7
3	Count	0	2	2
	% within SICU/Ward	0.0	1.7	1.3
4	Count	0	1	1
	% within SICU/Ward	0.0	0.9	0.7
6	Count	1	0	1
	% within SICU/Ward	3.0	0.0	0.7
7	Count	22	0	22
	% within SICU/Ward	66.7	0.0	14.7
8	Count	10	0	10
	% within SICU/Ward	30.3	0.0	6.7
Total	Count	33	117	150
	% within SICU/Ward	100.0	100.0	100.0

MEWS of 2 was found in 31 patients which accounts for 31% of the study population. MEWS of 3 was found in 2 patients which accounts for 1.3% of the study population. MEWS of 4 was found 1 patient which accounts for 0.7% of the study population.

MEWS of 6 was found in 1 patient which accounts for 0.7% of the study population. MEWS of 7 was found in 22 patients (66.7%) admitted in the SICU ward which accounts for 14.7% of the study population. MEWS of 8 was found in 10 patients (30.3%) of the study population and in total which accounts for 6.7% of the study population. the p value was found to be less than 0.1 and was found to be significant (Table 5).

Deaths in SICU

Number of deaths which occurred in the SICU were 7 patients which accounts to 4.7% of the study population (Table 6).

Table 6: Deaths in SICU.

			SICU/Ward		Total
			S	W	
Deaths	N	Count	26	117	143
		% within SICU/Ward	78.8	100.0	95.3
	Y	Count	7	0	7
		% within SICU/Ward	21.2	0.0	4.7
	2	Count	33	117	150
		% within SICU/Ward	100.0	100.0	100.0

MEWS - mortality predictability

The predictability of MEWS system was analysed with the following results:

- MEWS 0-6 patients were alive (4.0%) of the study population.
- MEWS 1-77 patients were alive (51.3%) of the study population.
- MEWS 2-31 patients were alive (21.7%) of the study population.
- MEWS 3-2 patients were alive (1.3%) of the study population.
- MEWS 4-1 patient was alive (0.7%) of the study population.
- MEWS 6-1 patient was alive (0.7%) of the study population.
- MEWS 7-22 patients were alive (15.4%) of the study population.
- MEWS 8-3 patients were alive (2.1%) and 7 patients died (100%) of the study population.

The p value of MEWS system in detecting deaths of the patients undergoing major surgical procedures was found to be less than 0.1 and was found to be significant (Table 7).

Table 7: MEWS-Mortality predictability.

		SICU/Ward		Total
		Active	Dead	
MEWS				
0	Count	6	0	6
	% within SICU/Ward	4.2	0.0	4.0
1	Count	77	0	77
	% within SICU/Ward	53.8	0.0	51.3
2	Count	31	0	31
	% within SICU/Ward	21.7	0.0	20.7
3	Count	2	0	2
	% within SICU/Ward	1.4	0.0	1.3
4	Count	1	0	1
	% within SICU/Ward	0.7	0.0	0.7
6	Count	1	0	1
	% within SICU/Ward	0.7	0.0	0.7
7	Count	22	0	22
	% within SICU/Ward	15.4	0.0	14.7
8	Count	3	7	10
	% within SICU/Ward	2.1	100.0	6.7
Total	Count	143	7	150
	% within SICU/Ward	100.0	100.0	100.0

The predictability of MEWS system was analysed with the following results:

MEWS 1-77 patients were alive (51.3%) of the study population. MEWS 8-3 patients were alive (2.1%) and 7 patients died (100%) of the study population. This indicates that the greater MEWS the mortality of the patient rises and the lesser MEWS the chances of mortality in the P.O period is very minimal (Table 7).

DISCUSSION

The aim of this study was to critically appraise the development of role of the modified early warning score (MEWS)by monitoring vital signs including calculating, totaling, recording and communicating. The implementation of a new MEWS observation chart plus a supporting educational programmed was associated with statistically significant increases in frequency of combined and individual vital sign set recordings during the first 24h post-ICU discharge.[16]

Implications for the project

Routine vital signs monitoring is frequently delegated to the HCA. A recurrent theme in the literature highlighted

that the monitoring of vital signs has become ritualistic, task oriented with an over reliance on use of digital equipment.

HCAs were found to have a lack of knowledge to undertake vital signs monitoring, and repeated failings of observations that were incomplete and inaccurate have been identified (Hogan 2006).[7] It is essential that HCAs are trained, skilled and assessed as competent in their role to enhance their ability to recognize and communicate early signs of deterioration. This will ultimately improve the quality of care for patients.

The HCA is ideally placed to contribute to improvements in acute patients care and as such must be recognised as valued team members who are educated and trained to deliver safe quality care to patients in their care.

Physiological parameters incorporated into MEWS

MEWS incorporated the routine measurement of 6 physiological parameters to assess illness severity: pulse rate, systolic B.P, R.R, level of consciousness, temperature, urine output.

Disturbances in multiple parameters in unison are more common and an aggregate of the magnitude of disturbance is a more robust measure of acute-illness severity in postoperative patients. Significant disturbances in these six parameters are not necessarily unidirectional, thus upward and downward trends needed to be weighted and scored.

RR

Tachypnea is seen in generalized pain and distress, sepsis remote from the lungs, CNS disturbance and metabolic acidosis. Bradypnea may indicate CNS depression and narcosis.

Temperature

Both pyrexia and hypothermia are sensitive markers of acute-illness severity.

Systolic BP

Hypotension may indicate circulatory compromise due to sepsis or volume depletion, cardiac failure or cardiac rhythm disturbance, CNS depression and hypoadrenalism

Some people have a naturally low systolic B.P (<100 mmHg) and this might be suspected if the patient is well and all other physiological parameters are normal or confirmed by reference to previous records of B.P. Hypertension is given less weighting in the context of acute-illness assessment. Severe hypertension may occur due to pain or distress, but it is important to consider whether the acute illness may also be a consequence of or exacerbated by severe hypertension and take appropriate clinical action.

Pulse rate

Tachycardia may be indicative of circulatory compromise due to sepsis or volume depletion, cardiac failure, pyrexia, or pain and general distress. It may also be due to cardiac arrhythmia, metabolic disturbance, e.g. hyperthyroidism Bradycardia, an equally significant parameter may be normal with physical conditioning, or due to hypothermia, CNS depression, hypothyroidism, heart block.

Level of consciousness

Alert Voice Pain Unresponsive (AVPU) scale is recommended for assessment of consciousness level. It is done in sequence and only one outcome is recorded. New onset confusion: assessment of confusion does not form part of the AVPU assessment. Nevertheless, new onset or worsening confusion should always prompt concern about potentially serious underlying causes and warrants urgent clinical evaluation.

Urine output

Formal estimation of urine output is not always available at first assessment and measurement of urine output is not routine in the majority of patients in hospital. MEWSDIG did not consider it practical or necessary for formal monitoring of urine output to be part of the scoring system for MEWS.

That said, MEWSDIG recognized that urine output monitoring is essential for some patients as dictated by their clinical condition/clinical setting and this has been included on MEWS chart to highlight the importance of recording urine output when considered clinically appropriate to do so.

Comorbidities including immunosuppression

Comorbidities do impact on clinical outcomes. There are disease-specific scoring systems, the use of which is not precluded by MEWS. Furthermore, MEWS is designed to be generic and should reflect the physiological perturbations associated with various comorbidities. The working group recommended that no additional weighting should be allocated to MEWS aggregate score for comorbidities immunosuppression.

Scoring system for MEWS physiological parameters

Once measured and recorded, the six physiological parameters and the uplift for supplemental oxygen had to be weighted and aggregated to derive MEWS. For each physiological parameter, a normal 'healthy' range was defined.

Measured values outside his range were allocated a score which was weighted and colour-coded on the observation chart according to the magnitude of deviation from normal range. The weighting reflects the severity of the physiological disturbance. The working group reviewed the weightings used in a number of MEWS systems, particularly Views, and made adjustments.[17]

How MEWS works

MEWS aggregate of 5–6 should trigger a medium-level clinical alert, i.e. an urgent clinical review; and score of 7 or more should trigger a high-level clinical alert, i.e. an emergency clinical review. MEWSDIG also recommended that an extreme score in any one physiological parameter, recorded as any RED score on MEWS chart, should also trigger a medium-level alert.

*RED score refers to an extreme variation in a single physiological parameter (i.e. a score of 3 on MEWS chart, coloured RED to aid identification and represents an extreme variation in a single physiological parameter). The consensus of MEWSDIG was that extreme values in one physiological parameter (e.g. heart rate <40 beats per minute, or a R.R of <8 per minute or a temperature of<35°C) could not be ignored and on its own required urgent clinical evaluation.

A key difference between Views and MEWS is that MEWS allows a trigger RED score of 3 for single extreme values of any physiological parameter, rather than solely based on an aggregate score. The decision to trigger on the basis of single extreme values was based on the clinical opinion of the group linked to patient safety and clinical governance.

MEWSDIG recognized that the overall performance of MEWS or any other EWS system is not solely dependent on the scoring system but the chosen outcome plus the sensitivity of the trigger thresholds and crucially, the organisation of the response

Using MEWS

MEWS should be recorded immediately after surgery and two hours after surgery. Six parameters should be recorded, each being allocated a score. There should be two mechanisms for triggering a medical team review: an extreme variation in an individual physiological parameter, i.e. a RED score (i.e. a score of 3 in any one parameter), or more commonly, an aggregate score of 5-6. Need for escalation of care is determined by MEWS MEWS of 7 or more will often necessitate patient transfer to a higher dependency area.

MEWS should be used to guide the frequency of patient monitoring. Education and training and demonstrable competency in the use of MEWS should be a mandatory requirement for all healthcare staff.

MEWS should be used as objective data to aid clinical decision-making- it is not a barrier or alternative to skilled clinical judgment. There will be circumstances when a healthcare professional judges that MEWS underestimates their concern for the patient's clinical condition. In such circumstances, care must be escalated to a more senior clinical decision-maker. In circumstances in which the healthcare professional feels MEWS may be overestimating the severity of a patient's clinical condition, they should also escalate decision-making to a more senior decision-maker within the clinical team to determine if escalation of care is warranted or not. MEWS system will only work if there is availability of trained staff and response systems.

Use MEWS to define and record

- whether escalation of clinical care is required and its urgency
- the competencies of the clinical review required
- the frequency of monitoring required
- the most appropriate clinical setting for ongoing clinical care.

Using MEWS

MEWS chart provides a standardized system for recording routine clinical data. Colour-coding will provide visual prompt as well as a numeric score of illness severity. Clinical response to MEWS should be agreed locally and organized around three graded triggers (low, medium, high).

Organization of the local response to MEWS

MEWS is designed to enable HCAs to recognize acute clinical deterioration and to trigger different levels of clinical response, proportionate to illness severity. The evaluation of MEWS provides an indication of the potential workload impact with regard to clinical responders to medium and high MEW scores. Local arrangements should ensure that:

- the urgency and competency of response to acute illness is guaranteed 24/7
- There are appropriate settings and trained staff in place for ongoing care

The speed and urgency of response is a critical determinant of clinical outcomes. The processes for alerting HCAs and ensuring a timely clinical response should be agreed locally

MEWSDIG concluded that 12-hourly monitoring was minimum and noted many patients would require more frequent monitoring. Low-score group need 12 hourly monitoring, increasing to 4–6 hourly for MEWS 1–4, unless more or less frequent monitoring was considered appropriate by a competent clinical decision-maker.

The frequency should be increased to minimum of every hour for patients with score of 5-6, or RED score = 3 in a single parameter. Continuous monitoring is essential for patients with a score of 7 or more.

Using MEWS - appropriate setting for ongoing clinical care

MEWS should be used to aid decision-making regarding the clinical setting for ongoing care, including: Access to facilities for more frequent clinical monitoring, Timely access to HCAs trained in critical care. Local policies should be in place to define pathways for efficient and seamless escalation and transfer of care when required.

Clinical competencies of responders to MEWS

The competencies should be built around the 'chain of response' reflecting escalating levels of intervention in the care of an acutely ill postoperative patients, corresponding to low, medium and high track-and-trigger scores and that the response should be 'effective, timely and seamless'.

The key elements of the 'chain of response' are: the recorder, the recognizer and the responder. The responder can be further subdivided according to clinical competencies, i.e. the primary, secondary, and tertiary responder- the latter with competencies in critical care.

Clinical response to MEWS triggers

Full set of vital signs data should be charted using the 'minimum interval' algorithm (e.g. for a patient with a previous MEWS of 5, data from a continuous device must be charted at least hourly). At all levels of MEWS, but particularly at levels of 7 or above, clinical staff should consider the 'ceiling of care'.

A study carried out in 2016 in Uganda to evaluate the prognostic performance of the MEWS system, a MEWS ≥5 was found to be an independent predictor of in-hospital mortality (odds ratio: 5.82; 95% confidence interval: 2.420–13.987; P < 0.0001) among critically ill patients.[18]

Inexperienced nurses feel more confident about when to call physician with MEWS, which provides objective, quantitative scores that guide action. But MEWS can never replace or undermine critical clinical thinking skills.[19]

Training and implementation of MEWS

MEWS is a standardized system for the education, training and credentialing of healthcare professionals. It is recommended that education and training and demonstrable competency in the use of MEWS should be a mandatory requirement for all healthcare staff engaged in patient care.

MEWS in association with a call-out algorithm is a useful and appropriate risk-management tool that should be implemented for all surgical in-patients.[20]

CONCLUSION

Surgical team should implement various ideologies for patient safety in perioperative period. MEWS is an effective tool in identifying the early warning signs in P.O period. It is a simple effective measure in identifying physiological alarms that are activated in the patient thereby incurring an early intervention by admission into SICU.

MEWS can be effectively used in patients undergoing both elective and emergency surgical procedures and has been proven to be valuable tool in analysing and assessing the prognosis in the P.O period.

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