

Reduce unexpected cardiac arrest events in the hospital and improve patient survival



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Introduction

- ◆ **Cardiac arrest** is an important safety issue for hospitals, it is also an important indicator of patient safety and quality.
- ◆ Once cardiac arrest occurs, it will bring fatal injuries to patients. The impact on hospitals and families is considerable.
- ◆ The primary focus of cardiac arrest incidents is **early identification and prevention**.
- ◆ Over time, the **patient's condition changes**, the literature indicates that about 60-70% of hospitalized patients will **have abnormal vital signs 6-8 hours before cardiac arrest**, but **only 25% were detected** by the care team.
- ◆ More studies have pointed out that these processes can be detected early through some indicators. Patient signs can predict that the patient's condition is deteriorating through a **clinical warning system**.

Methods

Statistics show that from **January to December 2019**, there were **96 cases** of unexpected cardiac arrest in a medical center in northern Taiwan. Through the analysis of the cause of the event through case retrospection, the following improvement strategies were formulated.

◆ Establish clinical alarm system prompts

Through event analysis, it was found that about **72% of patients had abnormal vital signs within 24 hours before the event**. Therefore, using the National Early Warning Score (NEWS), the score of the above **six items is calculated every 4 hours**. When **the score ≥ 5 points**, in the Hospital Information System (HIS), Nursing Information System (NIS), Integrated Management Information (iMMIS) patient data presents a **black exclamation point icon on a yellow background**. And optimize the existing handover system, so that the duty staff can grasp the medical conditions of the whole patients and deal with them in a timely manner.

性別	年齡	主治醫師	主治醫師	身份	入院日	機密	危急	護理	護理	護理
男	72	一般外科	李國豪	3202	體床	1090109	無	無	無	在院
男	60	胸外科	陳世源	1301	體床	1090103	無	無	無	在院
女	80	一般外科	石敬宜	3202	體床	1090108	無	無	無	在院
男	66	胸外科	陳世源	1109	體床	1090103	無	無	無	在院
男	68	一般外科	陳世源	3200	體床	1090109	無	無	無	在院
男	80	一般外科	陳世源	3217	體床	1090103	無	無	無	在院
男	64	一般外科	陳世源	3217	體床	1090100	無	無	無	在院



◆ Set up CAS score ≥ 5 points disposal and reply

When the CAS score ≥ 5 points, a warning icon appears on the list of patients in HIS, NIS, and iMMIS, indicating that the **patient's condition has changed**, and the doctor is asked to dispose of the patient and reply to the treatment status.

When the reply is restored, the black exclamation point icon on a yellow background **changes to a black exclamation point on a gray background**, and the CAS alert disappears when the CAS score < 5 points .

88	一般內科	陳世源	3259	體床	1090201	無	無	無	無	在院
80	老人醫學科	黃柏興	1188	體床	1090211	有	無	無	無	在院
59	一般內科	陳世源	3228	體床	1090129	無	無	無	無	在院
89	一般內科	陳世源	1189	體床	1090206	無	無	無	無	在院

◆ The emergency review mechanism for unexpected cardiac arrest events in the hospital is carried out every month

Through the review and analysis of first aid incidents, the correct concept and operation of first aid of colleagues in the hospital were improved, and the quality of clinical emergency was reflected.

◆ Combined with team resource management and simulation training, to improve the efficiency and quality of first aid

Through **simulation training and combined with team resource management**, to strengthen the systematic, complete and teamwork first aid process, and improve the efficiency of first aid in the hospital.

Results

- ◆ Mortality from in-hospital unexpected cardiac arrest events decreased from 69% to 63% ($p < 0.05$).
- ◆ The proportion of patients with unexpectedly occurring cardiac arrest in hospital who survived and discharged from hospital increased from 30% to 34% ($p < 0.05$).
- ◆ The proportion of cardiac arrest to chest compression time ≤ 1 minute increased from 95% to 99% ($p < 0.01$).
- ◆ The proportion of VT and VF to defibrillation time ≤ 3 minutes increased from 91% to 100% ($p < 0.01$).
- ◆ The time for administering vasopressor ≤ 5 minutes increased from 81% to 90% ($p < 0.05$).
- ◆ The proportion of patients with cardiac arrest who return of spontaneous circulation (ROSC) increased from 66% to 68% ($p < 0.05$).

Conclusion

- ◆ Screening patients in high-risk groups through information systems. **Provide appropriate clinical early warning to help the care team accurately understand the patient's condition, achieve early detection, early intervention to improve the patient's condition.**



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