The Economy of Time and Labor in Cardiac Remote Monitoring by Standard Operating Procedure

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Introduction: Alerts-driven clinical management is a promising strategy for patient management with cardiac implantable electrical devices (CIEDs). However, tremendous numbers of alerts have increased the daily work of medical staffs. The additional supporting strategy had better be used for high volume centers.

Methods: Standard operating procedure (SOP) was generated to perform a prompt and adequate response against alerts and to reduce tasks of medical staffs as follows. First, the information from the remote monitoring system is handled by clinical engineers. According to the SOP, the clinical engineers decide whether the alert should send to the physician or not. Currently, we are using the SOP only for atrial fibrillation (AF) and non-sustained ventricular tachycardia (NSVT). In the case of an alert of AF, the clinical engineers only send the alert to the physicians if the AF has lasted for 6 or more minutes without anticoagulation therapy. When repeated alerts for AF with anticoagulation therapy from the same patient are received, we change its SOP to the second SOP. In repeated AF cases, the alert criteria for AF are changed to burden >25%. In the case of a NSVT alert, we send the alert to the physicians if ventricular tachycardia has lasted for 15 or more beats. In addition, any false recognition by remote monitoring system or short duration and high rate ventricular tachycardia (10 to 14 beats, over 150 bpm events) is treated as an alert that should be sent.

Result: All remote monitoring alerts were collecting from Medtronic or BIOTRONIK company's CIEDs, excluding leadless pacemakers and implantable cardiac monitors. AF events (n=117) were received from 191 patients during the last six months. Within the AF events, the 88 events (51.5% of total AF events) were ruled out by SOP from consulting the physicians. NSVT events (n=123 events) were also received during the same periods. Fifty-two events (42% of total NSVT events) were excluded by SOP from further consulting. There has been no major adverse event under SOP-conducted clinical management. SOP-conducted triage of alerts from remote monitoring system of the cardiac device could reduce many unnecessary submissions of alerts to the physicians. All SOP-conducted triage of the alerts could be operated by clinical engineers. Before the use of SOP, a triage of alerts from remote monitoring system had tended to make a variation in an evaluation of alerts among medical engineers due to lack of grounds for assessing of alerts. In terms of standardization of handling alerts, SOP contributed to a homogenization of the technological gap between medical engineers.

Conclusion: SOP combined use of remote monitoring system of cardiac devices has enabled us to a prompt response for important alerts and reduce the task of the physicians without any problem.