

呼吸量监测系统能先于脉搏氧饱和度监测到呼吸损伤，并有助于减少假饱和度报警

发表杂志	J TRAUMA ACUTE CARE SURG
研究机构	<ul style="list-style-type: none">● University of Maryland School of Medicine● Emory University School of Medicine,● Massachusetts General Hospital,● Harvard Medical School

背景:

监测呼吸功能是十分必要的。通过持续检测呼吸量，可以在低血氧症前识别呼吸抑制并提早干预治疗。这里，评估呼吸量检测（非插管患者的实时每分钟通气量[MV]，潮气量和呼吸频率）与低血氧症的时间关系，并帮助区分患者运动或探头移位导致的真假去饱和。

方案:

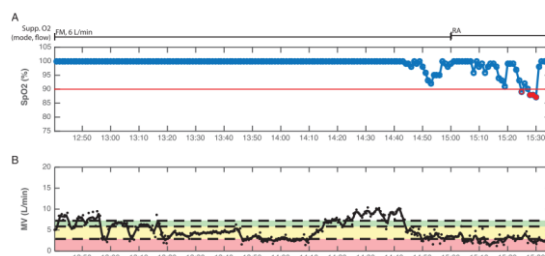
分析了 259 位外科手术患者的呼吸量监测数据、血氧饱和度（SpO₂）、供氧和阿片类药物使用情况。在 SpO₂ 低（<90%）之前检测到“低 MV”（<MV 预测值的 40%）用来区分真假去饱和。患者也会依据阿片类药物使用情况和“低 MV”情况进行分组。比较各组患者的住院时间（LOS）和 SpO₂ 警报数量。

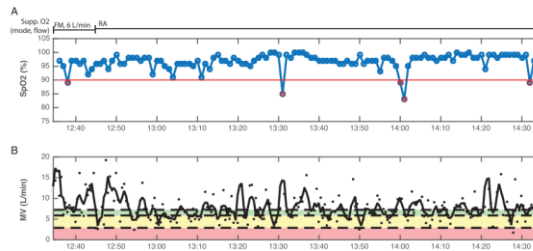
结果:

电子报告记录了 113 次 SpO₂ 报警；105（93%）次报警前没有“低 MV”现象，因此是假去饱和。“低 MV”现象领先 8 次真去饱和 12.8±2.8min。259 位患者中 198 位（76%）出现一次或多次“低 MV”事件。“低 MV”患者在 PACU 的 LOS 明显长于维持“足够 MV”的患者：2.8±0.1h vs. 2.4±0.1h(p<0.001)。接受阿片类药物治疗的患者发生“低 MV”的可能性增加(80% vs. 69%; p<0.05)并且在 PACU 的 LOS 明显更长(2.9±0.1h vs. 2.3±0.1h; p<0.001)。在阿片类药物组中，发生“低 MV”的患者在 PACU 的 LOS 比维持“足够 MV”的患者长 75%(3.0±0.1h vs. 1.7±0.2h; p<0.001)。

结论:

呼吸量监测可以提供血氧饱和度降低的预警，并可能降低假警报。阿片类药物增加了“低 MV”事件并导致 LOS 增加。呼吸量监测能够帮助临床个体化病人护理，减少误报，调整阿片药物剂量，并提高 PACU 吞吐量。类似优点在普通病房、住院前及住院后一样适用。





Evaluation of Respiratory Volume Monitoring (RVM) to Detect Respiratory Compromise in Advance of Pulse Oximetry and Help Minimize False Desaturation Alarms

Background: Monitoring respiratory function is important. By continuously monitoring respiratory volumes, respiratory depression could be identified before hypoxemia and drive earlier intervention. Here, we evaluate the temporal relationship of respiratory volume monitoring (providing real-time minute ventilation [MV], tidal volume, and respiratory rate in non-intubated patients) to hypoxemic episodes and its potential to help classify true vs false desaturations (related to patient movement/ probe dislodgement).

Methods: Respiratory volume monitoring data, oxygen saturation (SpO₂), oxygen supplementation, and opioid use were analyzed in 259 patients following orthopedic surgery. Detection of “low MV” (<40% of predicted MV) in advance of low SpO₂(<90%) was used to classify true and false desaturations. Patients were also stratified based on opioid use and development of low MV. Patient's length of stay (LOS) and number of SpO₂ alarms were compared across groups (\pm opioids; \pm low MV).

Results: The electronic health records reported 113 SpO₂ alarms; 105(93%) not preceded by low MV and considered false. Low MV preceded the eight true desaturations by 12.8 ± 2.8 minutes. One hundred ninety-eight patients (76%) of 259 experienced one or more low MV events. Patients with low MV had significantly longer post-anesthesia care unit (PACU) LOS than those maintaining “adequate MV”: 2.8 ± 0.1 hours vs. 2.4 ± 0.1 hours ($p < 0.001$). Patients receiving opioids had increased likelihood of low MV (69% vs. 80%; $p < 0.05$) and had significantly longer PACU LOS than those without opioids (2.9 ± 0.1 hours vs. 2.3 ± 0.1 hours; $p < 0.001$). In the opioid group, PACU LOS was 75% longer in patients developing low MV versus maintaining adequate MV (3.0 ± 0.1 hours vs. 1.7 ± 0.2 hours; $p < 0.001$).

Conclusions: Respiratory volume monitoring can provide advanced warning of impending oxygen desaturation and potentially reduce the number of false SpO₂ alarms. Opioid administration increased low MV events correlating with increased LOS. Respiratory volume monitoring can help clinicians individualize patient care, decrease false alarms, adjust opioid dosing, and increase PACU throughput. Similar benefits may translate to the general care floor and prehospital and posthospital environments.