Head-mounted display evaluation in anesthesia for rigid cystoscopy

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Aims
We evaluated a head-mounted display (HMD) of vital signs in the clinical environment to determine whether the effects of HMDs found in prior simulator studies would:
a) generalize to clinical practice
b) be any different during crisis management

Methods
Six attending anesthesiologists each provided anesthesia to six patients undergoing urology procedures at the Royal Adelaide Hospital. Each of the participant’s six cases were alternated between two experimental conditions:
• Control – standard monitoring (Philips IntelliVue™ MP70)
• HMD – standard monitoring plus the HMD

The HMD displayed almost all of the vital signs available on the MP70. Tidal volumes were measured by the ventilator and not available on the HMD.

Results
Cases ranged in duration from 17 to 75 minutes (median 31 mins). In total, 16,342 head turns were coded from 22 hours of video data.

Participants in cases where the HMD was available spent:
• less time looking towards the anes. machine (p=0.003)
• more time looking towards the patient (p=0.014) compared to their Control condition cases.

While managing a regurgitation episode, an anesthesiologist using the HMD:
• spent less time looking at the anesthesia machine (9.9% vs 26.1%, p=0.035)
• looked towards the anesthesia machine less frequently (1.36 vs 3.61 looks per minute, p=0.009)
• looked at the patient for longer each time (16.212 vs 2.773 seconds, p<0.001) compared to their own Control condition baseline.

Conclusions
A head-mounted display of patient vital signs lets anesthesiologists spend more time monitoring their patient’s clinical signs during normal anesthesia and especially during crisis management.

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