

O-06

REALTIME DATA ACQUISITION IN THE SURGICAL OPERATION THEATRE FOR ANALYSIS OF THE WORKFLOW

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PURPOSE

The acquisition and an analysis of the intraoperative situation is a promising, however challenging task. If there's an exact knowledge of the actual phase of the intervention it will become possible to predict on one hand the remaining duration of surgery, but furthermore, complications, respective deviations from the standard workflow could be identified.

METHODS

We equipped an integrated OR system with several additional sensors to record the actual situation and to detect deviations from the standard workflow. Additionally, the position of the surgeon and the assistant on the operation table is recorded with RFID tags to identify training situations, in which the assistant takes over steps of the surgery. Data from sensors is recorded and displayed in real-time on a data acquisition computer. Monitored interventions were laparoscopic cholecystectomies, since this is a short to medium operation with a highly standardized workflow.

Precision is proved in a blinded setting, where the observer gets only insight to the data acquisition computer and identifications were proven afterwards with the recorded video and the time stamps. Goal is to identify deviations from the standard workflow.

RESULTS

It could be shown that in an extended integrated operation suite, based on data recorded in real-time, it becomes possible to detect deviations from the workflow and to identify several phases of the surgical intervention. Conversions from laparoscopic to open surgery could be identified with a precision of 100%, the transition from preparation and clipping of the bile duct and the cystic artery to removal of the gallbladder with the same precision.

CONCLUSION

Data captured in real-time during surgery allows the identification of several phases of the intervention and the detection of complications. Granularity, however, could be increased if the actually used instrument could also be recorded in parallel to other sensor data.

Our system is, up to now, only able to record and to visualize sensor data; system intelligence would increase sensitivity and led to an automated operation monitoring suite, which is able to call the next patient or even to inform the operation room manager about prolongations.

