

Poster session

ENDOTRACK: TRACKING AND MONITORING SURGICAL SPONGES USING RFID TECHNOLOGY

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Introduction - Retained surgical sponges inside a patient following surgery is a rare but critical event leading to severe clinical, economic and social consequences. Hospitals have been urged to develop strict protocols to count sponges in order to track items during surgery and to prevent errors. Operating teams still perform count manually but this procedure is extremely susceptible to error. The introduction of X-ray detectable sponges contributed to reducing incidence of these cases, however, these systems do not allow prevention of the event, may involve radiological risks and could be expensive.

Materials and Method – In order to make an automated process, less susceptible to human error and to reduce time for counting, as well as to locate the sponge in the patient's abdomen, our team has designed, developed and tested a system which provides to the use of sponges with RFID tags detectable by remote reading. The system consists of:

- a management software;
- three antennas for the initial counts of sponges, the counts of used sponges and for the localization in patient;
- sponges fitted with RFID tags.

All antennas and tags used work in HF (13.56 MHz).

Test - After an initial phase of analysis to identify the best configuration tag/antenna in terms of reading distances, biocompatibility, size and radiated power, the system has been evaluated in experimental tests in vitro and in vivo. Preliminary in vitro tests have allowed us to assess the efficiency of the system, as well as to improve the device's ergonomics. Subsequent tests were conducted at the Station for Animal Technology of the University of Rome Tor Vergata. The animal laboratory session was conducted on about 70 kg pigs. We've inserted tagged sponges in different anatomical sites or by placing sponges overlying or individually, in order to test the effectiveness of the system.

Results and conclusions - We performed several tests and we obtain satisfactory results with respect to efficiency and repeatability of the measurements. The prototype has correctly identified the total number of sponges present within the body of the pig in the 100% of cases.