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SURGISECURE: RFID-Enabled Surgical Gauze to Prevent Retained Surgical Items in Low-Resource Operating Theatres

BACKGROUND

- Retained surgical items (RSI) occur in approximately 1 in 5,500 Surgeries, with surgical sponges responsible for 70% of cases.
- RSIs are associated with significant patient harm, causing more than 50% morbidity and up to 10% mortality
- Despite manual counting protocols, RSIs persist due to human error, particularly during emergency and high-volume procedures

OBJECTIVE - To develop and assess an RFID embedded surgical gauze system for automated sponge detection to reduce RSI in resource limited operating rooms.

TECHNOLOGY AND SYSTEM DESIGN

SurgiSecure embeds a passive RFID tag within standard surgical gauze, allowing automated sponge detection and count verification using a handheld scanner without altering routine operative workflow.

WORKFLOW

Preoperative Scan
Initial sponge count registered

Scan Gauze Before Closure
Confirmation of complete sponge retrieval

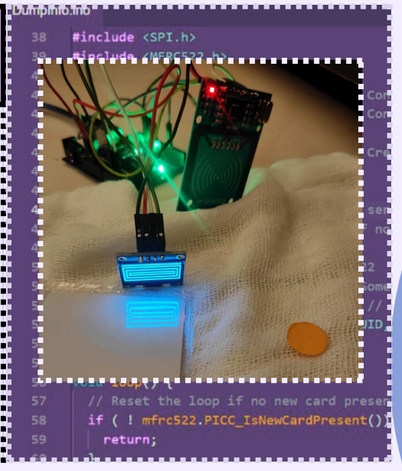
Intraoperative Scan
Gauze used as per routine practice
Detection of any retained gauze

CLINICAL IMPACT

- Automated Sponge Detection
- Seamless Workflow Integration
- Cost-Effectiveness
- Emergency Procedure Safety
- Resource-Limited Theatre Efficiency

RESULTS (IN-VITRO TESTING)

Parameter	Outcome
Detection accuracy	100%
Detection range & Time for tray count	Up to 70 cm in <10 Seconds
Performance with blood/saline & Autoclave	Unaffected

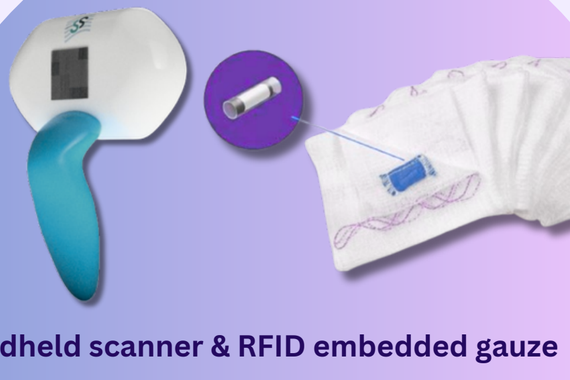


CONCLUSION

SurgiSecure demonstrates the feasibility of RFID embedded surgical gauze as a simple, low cost solution to reduce retained surgical items in resource limited operating theatres.

“ Smart gauze for safer surgery ”

REFERENCES



Handheld scanner & RFID embedded gauze