# CLOUD BASED AI-DRIVEN VIDEO ANALYTICS (CAVS) IN LAPAROSCOPIC SURGERY, A CLOSER STEP INTO A VIRTUAL PORTFOLIO.

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## INTRODUCTION

- Intraoperative video recording has become an essential part of modern-day practice. It serves multiple uses; continued performance assessment, quality improvement, training, governance (1).
- Recently, cloud-based AI driven video analytics has been introduced to theatres which allowed video recording to be more accessible and efficient (2).

## OBJECTIVE

- To report and compare the use of cloud-based AI-driven video analytics.
- To propose their usage as a virtual portfolio for laparoscopic surgeons.

## DESCRIPTION AND METHODS

- CAVs have become more widely used in many operative theatres worldwide.
- They provide a secured and an easy-to-use video storage through clouding.
- Online demonstration were requested for three platform.
- The demonstration included a walkthrough of the platforms with key information including :
  - Feasibility of cloud storage and secure anonymised recording.
  - Online and app-based accessibility.
  - Video analytics related to Colorectal surgery.
  - AI-integration for operation specific steps and critical views.

C-SATS PART OF THE Johnson & Johnson FAMILY OF COMPANIES

TOUCHSURGERY from Medtronic

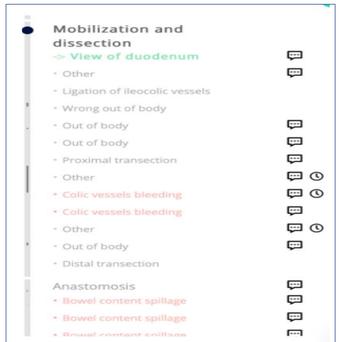
theator

## RESULTS

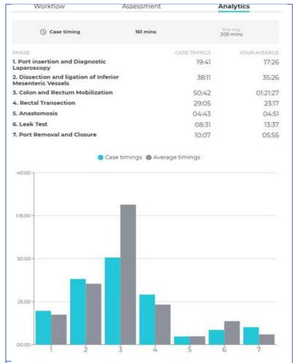
- *Theator, CSATS and Touch surgery (table-1) provided walkthroughs of their cloud based AI analytics platforms.*
- *They provide a secured and anonymized video clouding which is easily integrated with a theatre setting through a feasible connection for all minimally invasive surgeries.*
- *AI integration and computer vision play a major role in all platforms. Although each platform has its own AI specification, they allow video analytics in from of timing of each step, key steps performance, key land marks, anonymity and security. This also allow users to navigate through the procedure in an easy and step wise approach.*
- *Theator and CSATS has build in assessment scoring which can be used to assess and provide feedback. This can be done either through trainers or other members. Also, Theator provide users with customizable scoring system according to their preference.*
- *They provide easy accessibility through web-based or mobile apps with hyperlinks which can be used for governance, medical/operative records, sharing or tagging trainee and patient education.*
- *All platforms are complaint with quality assurance and governance framework in their respective regions.*

| Specs and specifications | Theator | C-SATS | Touch surgery |
|---|---|---|---|
| Integrated Cloud Storage | Yes | Yes | Yes |
| AI-Automation and Removal of Identifiable Information | Yes | Yes | Yes |
| AI- Automated Annotation of Steps | Yes | Yes | Yes |
| AI- Automated Annotation of Events | Yes | --- | --- |
| AI- Automated Annotation of Safety Milestones | Yes | --- | --- |
| ***Skill Assessment and Time Analytic*** | | | |
| Timing Analytics of Steps | Yes | Yes | Yes |
| Scoring Integration (GOALS, GEARS …) | Yes | Yes | --- |
| Customizable Scoring | Yes | --- | --- |
| Expert Panel Feedback | --- | Yes | --- |
| Live Participation and Streaming | Yes | --- | --- |

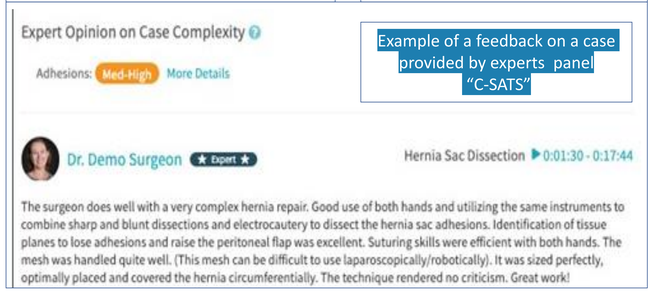
Table-1 summaries key specifications between the three platforms




Example of adverse events highlighted and analysed by AI "Theator"




Example of Anterior Resection AI-based annulation "Touch Surgery"




Example of a feedback on a case provided by experts panel "C-SATS"

## CONCLUSIONS

- Cloud based AI-driven video analytics (CAVs) is an emerging new technology which enables users to store, analyse, and review videos.
- They also provide surgeons with a powerful AI integrated services that can help to analyse their content. This have the potential to improve training, governance, and standardizing procedures.
- with the future adaptation of the technology, CAVs can be integrated into the surgeon's portfolio as part of their virtual curriculum.
- This can lead to a structured assessment of the progress of surgeons and their experience throughout different surgical career points whether in interviews for higher training, consultants' interviews, and annual appraisal.
- This is through a transparent and comprehensive surgical analysis which can lead to a more efficient analysis rather than conventional procedural logbooks.

## ACKNOWLEDGEMENTS

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## REFERENCES

1-Greenberg, C.C., J. Dombrowski, and J.B. Dimick, Video-Based Surgical Coaching: An Emerging Approach to Performance Improvement. JAMA surgery, 2016. 151(3): p. 282-283.

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