Learning Curve Evaluation

The evaluation of the **surgical learning curve** is essential to ensure safe patient care while trainees or newly appointed surgeons acquire proficiency in complex procedures.

CUSUM analysis provides a sensitive and objective method to monitor learning progression by identifying inflection points in performance over time.

In the context of ICP monitor placement, CUSUM enables:

- **Case-by-case tracking** of complications or technical success.
- **Visual representation** of performance trends, distinguishing between early learning phases and plateau.
- **Quantitative assessment** of the number of procedures required to achieve competence.

A typical learning curve may be characterized by:

1. An initial upward slope in the CUSUM chart (reflecting higher complication rates).
2. A turning point indicating skill acquisition.
3. A downward or stable plateau as proficiency is reached.

This analysis helps determine:

- When a trainee can perform procedures independently.
- If additional training or supervision is needed.
- The impact of changes in technique, supervision, or tools on outcomes.

Tracking learning curves using CUSUM fosters a culture of **data-driven education**, promotes **patient safety**, and supports **evidence-based credentialing** in neurosurgical practice.