Complex Information for Anesthesiologists Presented Quickly and Clearly

Anesthesia

Machine Learning for Anesthesiologists: A Primer

Machine Learning: A data-driven process where a computer learns without manual programming.1

Data for Modeling: are divided into two sets: training and testing. A training algorithm computes the relationships between features and outputs, which are then tested. A third, separate data set can be used for validation.

Features & Outputs: are the existing inputs and outcomes used to generate algorithms by machine learning.

Works well with: Systems with many features, Complex feature interactions

Neural Networks: are one class of machine-learning approaches.

Feed forward neural network: Input features are fed to outputs through hidden layers with weighted connections; weights are adjusted, matching inputs to outputs.

Machine Learning in Anesthesiology

Hypotension2

- Public data + local validation data
- Features from waveforms, with more than 3,000 new potential predictors identified
- Better predictions with machine learning

Postinduction Hypotension3

- 70% of data used for training, 30% for testing
- Propr and intraop data until induction
- Prediction performance similar to traditional modeling

Postoperative In-hospital Mortality4

- 80% of data used for training, 20% for testing
- Preop and intraop data until end of surgery
- Prediction performance similar to traditional modeling

Using machine-learning models to improve anesthesia care is a challenge that remains.

Intraop, intraoperative; preop, preoperative.