

# EP16.104 Artificial Intelligence Dystocia Algorithm (AIDA) as a Decision Support System in Transverse Fetal Head Position

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## Objectives

To evaluate the geometric parameters of transverse fetal head position during labour and to assess AIDA as a decision support system for standardising diagnosis and optimising clinical decision-making.

## Methods

- Secondary analysis of the AIDA development cohort: 135 nulliparous women with prolonged second-stage labour, three Italian hospitals (ethics CER 0320).
- 66 transverse-position cases stratified by midline angle (MLA): classic transverse  $\geq 75^\circ$ , near-transverse  $70\text{--}74^\circ$ , transitional  $60\text{--}69^\circ$  (Fig. 1).
- Four intrapartum-ultrasound parameters assessed: angle of progression (AoP), head–symphysis distance (HSD), MLA and asynclitism degree (AD).
- Each parameter graded green / yellow / red and each case assigned to an AIDA class, 0 to 4 (Fig. 2).
- Three machine-learning algorithms evaluated: random forest (RF), support vector machine (SVM) and multilayer perceptron (MLP).

### Caesarean delivery rate by transverse subgroup

**100%**

near-transverse (9/9)

**93.1%**

classic transverse (27/29)

**85.7%**

transitional (24/28)

## Results

- All AIDA Class 4 cases required caesarean delivery regardless of MLA value (21/21); Class 3: 90.6% (29/32) (Fig. 3).
- Of the seven vaginal deliveries, none occurred in the classic transverse group; five (71.4%) had at least one favourable (green) parameter.
- Concurrent asynclitism was associated with 100% caesarean delivery in the classic transverse group.
- RF achieved the highest predictive accuracy, followed by SVM and MLP (Table 1).

| Algorithm     | Accuracy (95% CI) | Sensitivity | Specificity | AUC  |
|---------------|-------------------|-------------|-------------|------|
| Random Forest | 0.955 (0.91–0.98) | 0.97        | 0.92        | 0.97 |
| SVM           | 0.933 (0.88–0.97) | 0.94        | 0.89        | 0.95 |
| MLP           | 0.897 (0.84–0.94) | 0.91        | 0.85        | 0.92 |

Table 1. Predictive performance for delivery outcome (N=66). CI, confidence interval; AUC, area under the curve.

## Limitations

Retrospective secondary analysis; small subgroups (n=9 near-transverse); three Italian centres only.

## Conclusion

AIDA with intrapartum ultrasound gives an objective, multidimensional assessment of transverse fetal head position and enables personalised labour management that may reduce unnecessary interventions.

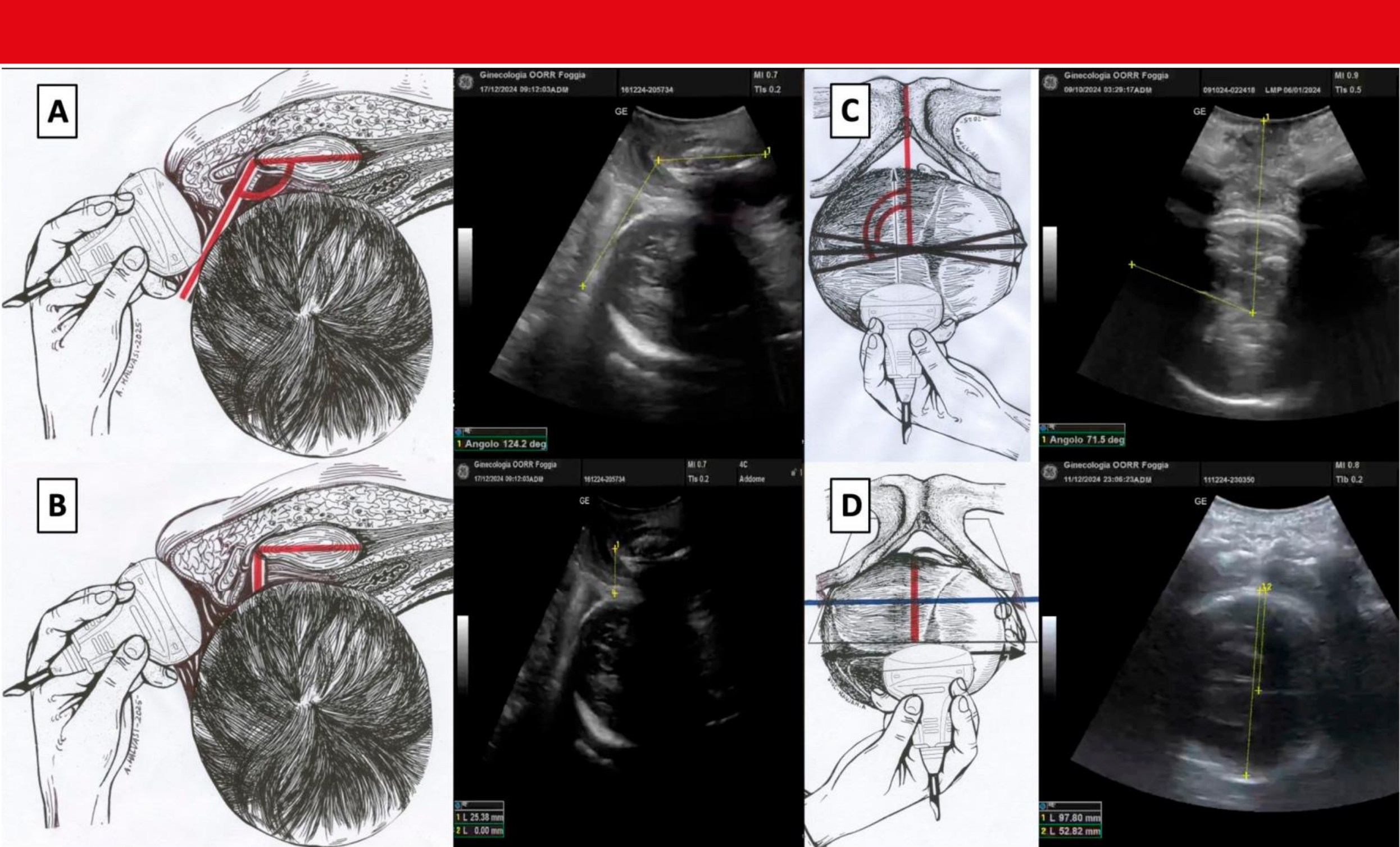


Figure 1. The four AIDA geometric parameters, drawing and ultrasound: (A) AoP, (B) HSD, (C) MLA, (D) AD, in right occiput transverse position.

| AIDA CLASSIFIER (N=135) |              |                                  |       |       |
|-------------------------|--------------|----------------------------------|-------|-------|
| Parameter               | Min - max    | Classification and cut-off range |       |       |
| HSD (mm)                | 10.0 – 51.0  | 10.0                             | 19.5  | 51.0  |
| AD (mm)                 | 4.0 – 95.0   | 4.0                              | 65.5  | 70.5  |
| MLA (°)                 | 26.0 – 90.0  | 26.0                             | 60.5  | 62.0  |
| AoP (°)                 | 72.0 – 192.0 | 72.0                             | 101.5 | 144.5 |

Green, if classified as belonging to the non-ICD delivery outcome  
Red, if classified as belonging to the ICD delivery outcome  
Yellow, if falling within a cut-off range

Figure 2. AIDA classifier: cut-off values and colour coding of the four geometric parameters (N=135).

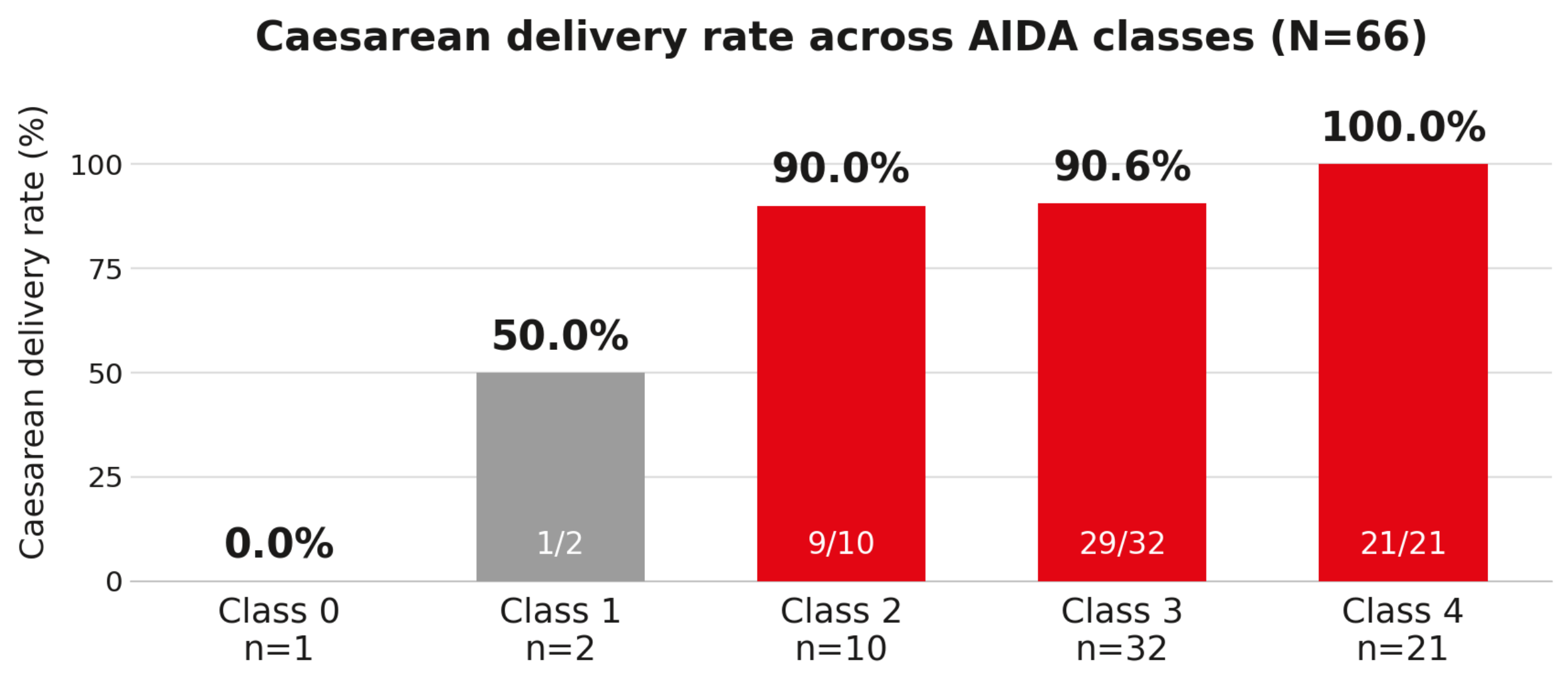


Figure 3. Caesarean delivery rate by AIDA class; figures in bars are events/total. Grey bars: classes with fewer than five cases.