

A new scale to assess acute pain facial expressions during intrauterine life: the Fetal-7 Scoring System

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Objective

Fetal interventions and some fetal conditions may generate fetal pain, and it would be interesting to quantify it in order to implement adequate treatment. It has been shown in a pilot proof-of-concept study that 3rd trimester fetuses under acute pain (ie. after intra-muscular anesthetic shot for intrauterine surgery) have facial expressions that are similar to neonates and can be measured with facial expression-based scales used in the extrauterine life such as the neonate facial scoring system. In the present study we have further refined such approach in an attempt to i. reduce items from that scale that do not discriminate acute pain from rest or non-specific startle and ii. providing a cut-off value score to distinguish pain from control conditions.

Methods

Fetuses were assessed with a 4D ultrasound focusing on the face in three conditions: acute pain (AP, n=5) (after anesthetic shot prior to intrauterine surgery): control group at rest (Co-Re, n=4): control group under external vibratory acoustic stimulation (Co-AS, n=4). Data were collected by an ultrasonographer using 4D films of facial expressions of 45 sec. and choosing the 5 screen-shots with the richest number of facial expressions.

Results

Analyses of 4D-derived screenshots were performed by blinded raters. Reduction of the scale was performed based on items either present or absent concomitantly in both the acute pain and the control conditions, ie: with no discriminant capacities. Data from both control situations were merged, then 2x2 contingency tables and correlation analyses were made. Two items were not scored on the screen shots: tongue protruding and chin quiver. Also, lips pursing, tongue protruding and yearning had very high p-values (>0.25), showing that they occurred in similar frequencies in the Acute Pain and the control groups (Co-Re / Co-AS). These items were excluded from the scale in subsequent analysis. The pain assessment tool consisted then of total of seven items: 1- brow lowering, 2 - eyes squeezed shut, 3- deepening of the nasolabial furrow, 4- open lips, 5- horizontal mouth stretch, 6- vertical mouth stretch, 7- neck deflection. Score cut-off determination: no control situation (rest or acoustic startle) had scores above 4, and, in the acute pain group, no score was below 5.

Conclusion

It seems to be possible to distinguish between fetal pain and other conditions (rest or surprise) using the proposed scale. Five could be used as an initial cut-off value for the subsequent validation of the seven-item scale.