

Estimated Fetal Weight: are we getting it right?

Auditing ultrasound based estimations of fetal weight and comparing these to measured birth weights to assess sonograaphic estimations of fetal weight.

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Background

Accurately estimating fetal weight (EFW) forms a cornerstone of modern obstetric practice in helping determine management plans relating to the mode and timing of delivery. This audit seeks to assess current routine practice at York and Scarborough Teaching Hospitals in objective terms.

The standards chosen were those observed by Francis, Tonks and Gardosi (2011) in their reveiw of EFW accuracy.

Standards

>= 96% EFW within 20% of BW
>= 90% EFW within 15% of BW
>= 73% EFW within 10% of BW

Methods

All obstetric growth scans performed from 24+0 weeks of gestation at York and Scarborough Teaching Hospitals (across five hospital sites: York Hospital, Selby War Memorial Hospital, Scarborough Hospital, Bridlington Hospital, and Malton Community Hospital) in January 2022 were reviewed. Further growth scans within the same pregnancy were also reviewed. All cases where delivery occurred within 14 days of examination were included. Only cases without available data (i.e. delivering elsewhere) were excluded. The birthweight (BW) was identified and error margin calculated using the Perinatal Institute’s EFW Audit Tool which adjusts for the interval between examination and delivery (adjusted EFW or EFWa). In addition to an overall analysis, sub-analyses were performed across the following:

1. Comparison between hospital sites
2. Ultrasound within three days of delivery
3. Maternal BMI

727 Scans were reviewed, comprising 620 patients, of which 304 delivered within two weeks and had data available.

EFW was calculated using the Hadlock-formula, calculated automatically by software on the department’s scanners. Of the 304 scans analysed, 289 had EFW calculated with Abdominal Circumference (AC), Femur Length (FL) and Head Circumference (HC) and 15 had EFW calculated with AC and FL only.

Results

The overall mean error was 7.1% with standard deviation 5.4%.

Site analysis	Proportion of scan error and confidence interval		
	+/- 10%	+/- 15%	+/- 20%
STANDARD	≥73%	≥90%	≥96%
All sites (N=304)	74.0% (73.6-74.6)	91.1% (89.3-92.3)	98.0% (96.7-98.9)
York site (York and Selby) (N=183)	73.2%	91.8%	98.4%
Scarborough site (Scarborough, Bridlington, and Malton) (N=121)	75.2%	90.1%	97.5%

Maternal BMI	Proportion of scan error		
	+/- 10%	+/- 15%	+/- 20%
<20 (N=21)	71.4%	81.0%	95.2%
20-35 (N=236)	74.6%	91.9%	98.3%
≥35 (N=46)	73.9%	93.5%	100.0%

Timing of delivery vs scan analysis	Proportion of scan error and confidence interval		
	+/- 10%	+/- 15%	+/- 20%
≤14 days (N=304)	74.0% (73.6-74.6)	91.1% (89.3-92.3)	98.0% (96.7-98.9)
≤3 days (N=74)	70.3%	90.4%	98.6%

Analysis

The analysis looking at hospital sites found that overall the standards across the 304 scans done across all sites across the whole trust were met and that the sub-analysis looking at both the York site (York and Selby) and the Scarborough site (Scarborough, Bridlington and Malton) were also met.

Comparing scans performed within three days of delivery (74 patients) with scans performed within fourteen days of delivery (304 patients), we were looking to see whether EFW error increased if the scan was done further from the delivery date. With only 74 patients in the group who delivered within three days of the scan, the number of patients is difficult to draw conclusions from. Overall as previously stated the patients who delivered within fourteen days of the scan met the standards, however those who delivered within three days of the scan did not meet the standards.

For the sub-analysis looking at maternal BMI, the standards were not met for all BMI categories. The numbers for BMI<20 and BMI>=35 were low and this could be the reason that the standards were not met in these categories. In the BMI20–35 category, the standards were met with 236 patients falling into this group. The Francis, Tonks and Gardosi 1997 poster on the accuracy of ultrasound EFW at term found the largest scan error in obese patients and smallest scan error in thin patients. This was the opposite of what we found in this smaller audit.

Conculsions

Overall EFW calculations are within an acceptable degree of accuracy and similar to findings (-0.4%, -4.4%, +0.5%) of the previous audit cycle (Hughes and Ferguson, 2021).

The sub-analyses were not consistently met though this may in part be due to a disparity in hospital site size (40% at one site), small numbers (only 19% of those eligible delivering within 3 days), and small numbers of thin (BMI<20 - only 6.9%) and obese (BMI>=35 - only 15.1%) women .

Further work is planned in the form of an expanded re-audit utilising a novel approach to rapidly collate and analyse data. This will generate more effective feedback which in turn may act as a substrate for continued cyclical improvement.

References

Francis, Tonks and Gardosi, 2011
Hughes and Ferguson, 2021
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