Understanding Ethnic Differences in Body Adiposity in the Newborn

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Introduction

Compared to Caucasians, South Asians (SA), including Indians, Pakistanis, Bangladeshis and Sri Lankans, have a much higher prevalence of metabolic syndrome, diabetes and insulin resistance (1). Furthermore, ethnic differences in body composition are also well recognised in adulthood. Understanding whether such differences are apparent at birth might give an insight into the pathogenesis adult cardiometabolic illness. In this study we have used whole-body magnetic resonance imaging (MRI) to compare body adipocity in Caucasian and SA neonates.

Methods: Whole body adipose tissue (AT) magnetic resonance imaging was performed in term healthy Caucasian and SA babies. MRI scanning was carried out as previously described (2). No sedation was necessary during any of the scans and all imaging was done under natural sleep. Research ethics approval and parent consent were obtained for all the participants. Images were analysed to predefined parameters and blinded to group identity. Images were analysed, using commercially available software (Sliceomatic), for total and regional adipose tissue depots, including total adipose tissue (AT) intra-abdominal (visceral), deep and superficial subcutaneous abdominal.

Results: A total of 53 neonates were scanned, 22 Caucasians and 31 SA, of similar gestational age and gender. In general SA babies were lighter and smaller than Caucasian neonates but had similar whole body AT content. Furthermore, SA babies had a highly significant increase in all abdominal AT compartments (Table 1) compared to Caucasian neonates.

Table 1

	Caucasian n=22 mean (SD)	**SA n=31 mean (SD)**	**95% confidence interval for difference**	**P**
Weight (kg)	3.37 (0.28)	2.71 (0.42)	0.46, 0.86	<0.001
Length (cm)	52.2 (1.5)	49.2 (2.0)	2.0, 3.9	<0.001
Head circumference (cm)	35.8 (1.1)	33.5 (1.3)	1.7, 3.0	<0.001
Total AT (l)	0.80 (0.18)	0.70 (0.22)	-0.01, 0.20	0.09
Visceral (% total AT)	3.9 (0.9)	6.4 (2.1)	-3.4, -1.7	<0.001
Deep subcutaneous abdominal (% total AT)	1.4 (0.7)	3.1 (2.0)	-2.5, -1.0	<0.001
Superficial subcutaneous abdominal (% total AT)	14.4 (1.9)	19.4 (4.1)	-6.6, -3.3	<0.001

Conclusions: Current preventative stratagems to combat the rising prevalence of the metabolic syndrome are largely focused upon intervention in adult life, rather than in infancy and childhood. Our data indicate that altered intraabdominal adiposity can be observed in SA babies around the time of birth. This opens the possibility that foetal health and maternal nutrition may contribute to the current epidemic of cardiometabolic ill heath observed in this population. MRI provides an accurate reproducible non invasive method to further study AT depots in different ethnic groups. Furthermore, other methods of assessing newborn body composition are unable to assess individual AT depots and as such would not appreciate the excess intraabdominal adiposity noted in this study.

(1) Forouhi NG. Wiley; 2005;
(2) Harrington T et al. Lipids 2002; 37:95-100