Auxological comparison and evaluation of spontaneous motility in the term newborn Small for Gestational Age employing General Movements method.

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Introduction

Term newborns Small for Gestational Age (SGA) have an increased risk for minor neurological impairment at pre- and school age. The general movements (GMs) assessment, in particular at Fidgety (F+) age, has been increasingly used to predict neurological dysfunctions.

Aim of the study

To evaluate, in a population of term newborn SGA (gestational age >37 weeks) the growth recovery, the presence of F+ at 3 months of age, and the neurological outcome at 2 years, compared to term AGA newborns.

Methods

Prospective evaluation of SGA newborns (birth weight and/or length < 3° percentile according to national growth charts) and AGA controls.

- **At 3 months we evaluate: the auxological parameters (AP) (weight, length, head circumference) and the assessment of spontaneous motility according to the Prechtl's evaluation of GMs method, the neurological examination (NE) according to Amiel-Tyson.**
- **At 6-12-24 months we evaluate AP + NE + neurodevelopment assessment by the Griffiths mental development scales.**

Results

We enrolled 38 SGA neonates at term (13M; 39±2 weeks of mean GA). Auxological data were compared to 20 AGA term neonates (6M; 39±3 weeks of mean GA) and summarised in Table 1.

		SGA	AGA	Comparison SGA-AGA	Comparison SGA at 3rd months
Gestational Age		39+2	39+3	-	-
At Birth	Weight (gr)	2404 (± 331)	3300 (± 425)	p < 0,001 *	
	Percentile	*1.69*	*42*		
	Lenght (cm)	46.6 (± 2,15)	50.5 (± 2,2)	p < 0,001 *	
	Percentile	*9*	*61.5*		
	Head Circumference (cm)	32.62 (± 1,23)	34 (± 1,29)	p=0,045	
	Percentile	*16*	*48*		
At 3rd months of life	Weight (gr)	5215 (± 563)	5640 (± 407)	p=0,04	
	Percentile	*22.7*	*27*		p <0,01 *
	Lenght (cm)	58.2 (± 2,25)	59.5 (± 2,4)	p=0,25	
	Percentile	*26.4*	*30*		p <0,01 *
	Head Circumference (cm)	39.27 (± 1,49)	39+3 (± 1,7)	p=0,23	
	Percentile	*22.35*	*22*		p=0,76

Table 1: Auxological data at birth and at three months (mean ± DS). Although 13% of SGA population shows at least one auxological parameter < 3°p at three months of age, there was a significant growth recovery for length and weight for SGA neonates. *(Man Whitney U-test)*

At 2 years of age, a difference statistically significant between SGA and AGA was detected in each item of the Griffiths mental development scales (Fig. 3).

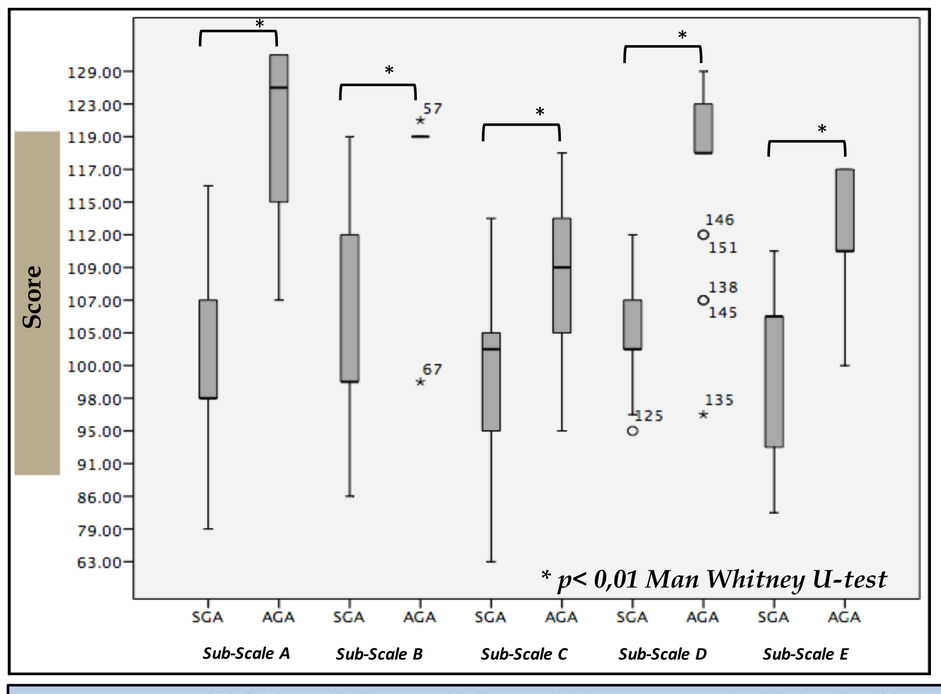

Fig. 3 Legend
Sub-Scale A: Locomotor
Sub-Scale B: Personal-Social
Sub-Scale C: Language
Sub-Scale D: Eye and Hand Co-ordination
Sub-Scale E: Performance

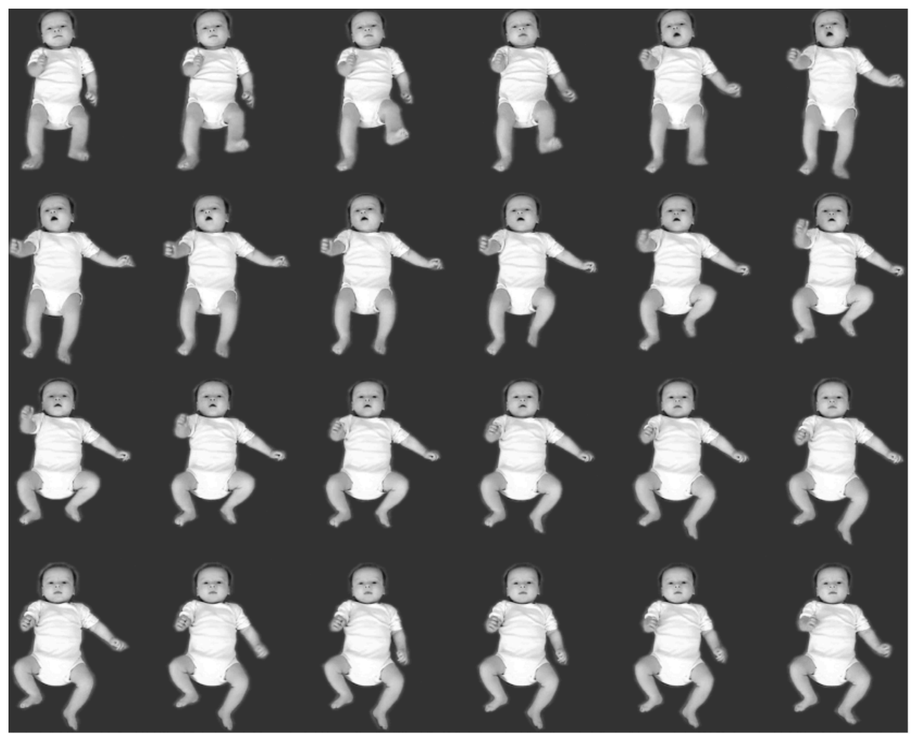

Fig. 1: Video print of a 14-week-old infant showing fidgety movements as time evolves from left to right and from top to bottom. A frame rate of 12.5 Hz is used, yielding a total time of 1.92 [*Einspieler et al. 2016*]

100% of AGA newborns presented F+ at three months, while in SGA children 23.7% (4M, 5F) did not show F+ (p<0.001) (Figure 2). No substantial differences were recorded in weight (p=0.53), length (p=0.32) and cranial circumference (p=0.24) at birth and at 3 months (respectively p=0.49, p=0.84, p=0.84) between SGA F+ and SGA F-.

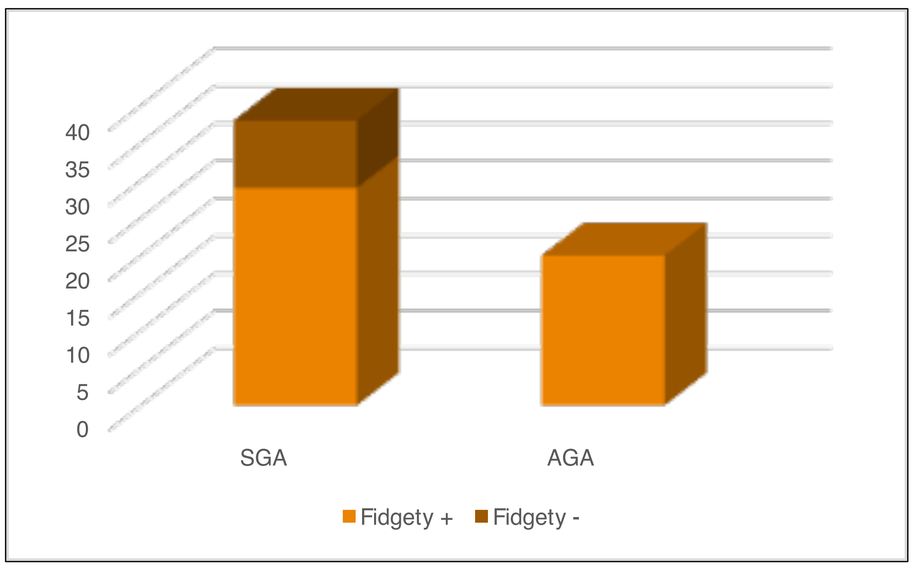

Figure 2: Absent Fidgety in about 24% of SGA population at three months of age.

Head circumference at birth was noticed to be a positive predictive factor for F+ (p=0.039).

Conclusions

Independently from the growth recovery, at three months of age, about 1/4 of SGA newborns do not show Fidgety movements. At 2 years of age the neurodevelopmental assessment reveal differences in each domain of evaluation between SGA and AGA children, although within the normal ranges. We may assume that intrauterine growth restriction and the reduction of cranial circumference could have a negative effect on neuropsychological development and that SGA children may need an attentive neurological follow-up.

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