

Morning salivary cortisol and stress response in term and preterm infants hospitalized in the intensive care unit.

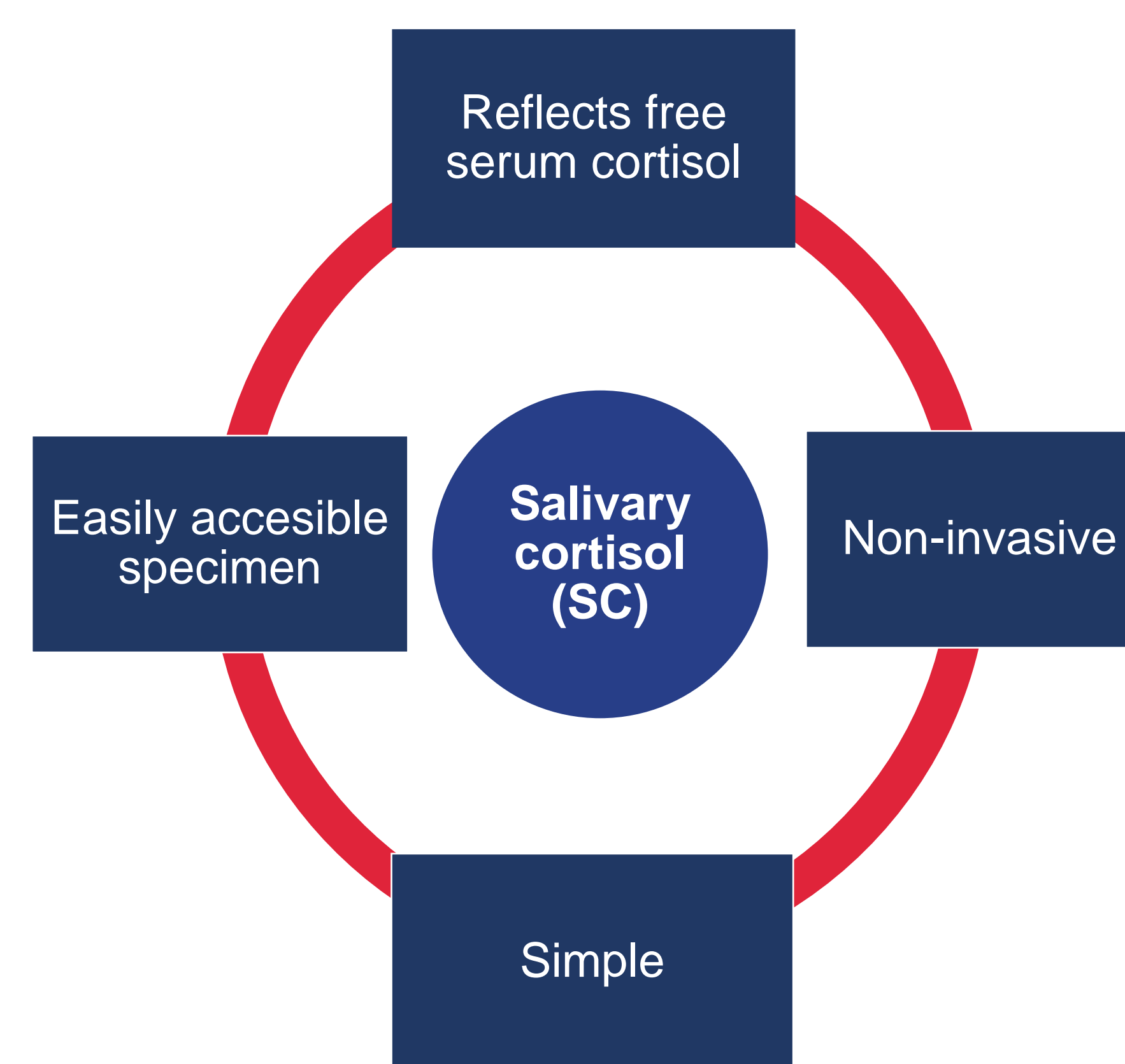
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INTRODUCTION

Newborns admitted to the intensive care unit (ICU) are exposed to multiple painful and stressful procedures¹. It is postulated that high pain exposure in the first weeks of life can have a long-lasting impact on the hypothalamic-pituitary-adrenal (HPA) axis². Assessment of the salivary cortisol (SC) is a useful method for monitoring stress response of HPA axis³.

Graphics 1. Advantages of SC measurements



RESULTS

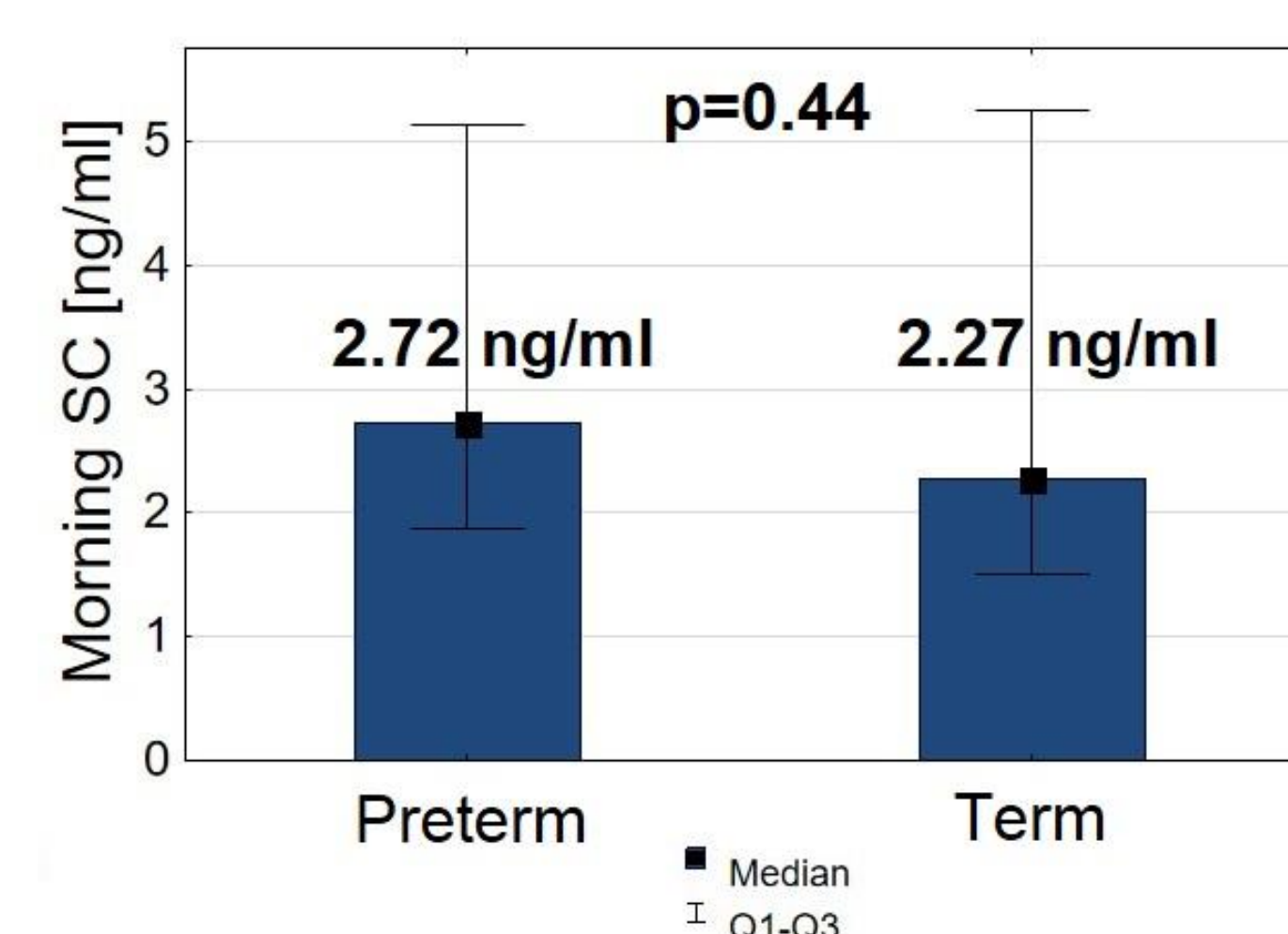
The study group consisted of 25 (38.46%) term and 40 (61.54%) preterm neonates.

Table 1. Basic characteristics of the analyzed group

Characteristics	Preterm	Term	p
Male, n (%)	20 (50%)	14 (56%)	0.64*
Gestational age, weeks	32 (28-24)	39 (38-10)	<0.001**
Birth weight, g	1500 (1130-2030)	3500 (3000-3700)	<0.001**
Cesarean delivery, n (%)	34 (85%)	10 (40%)	<0.001*
Apgar score 1st minute	6 (5-8)	9 (5-10)	0.16**

Qualitative data are presented as number with percent values, quantitative data as median values and its quartiles.
*chi-squared test, ** Mann-Whitney U test

Figure 1. Morning SC in preterm and term infants.



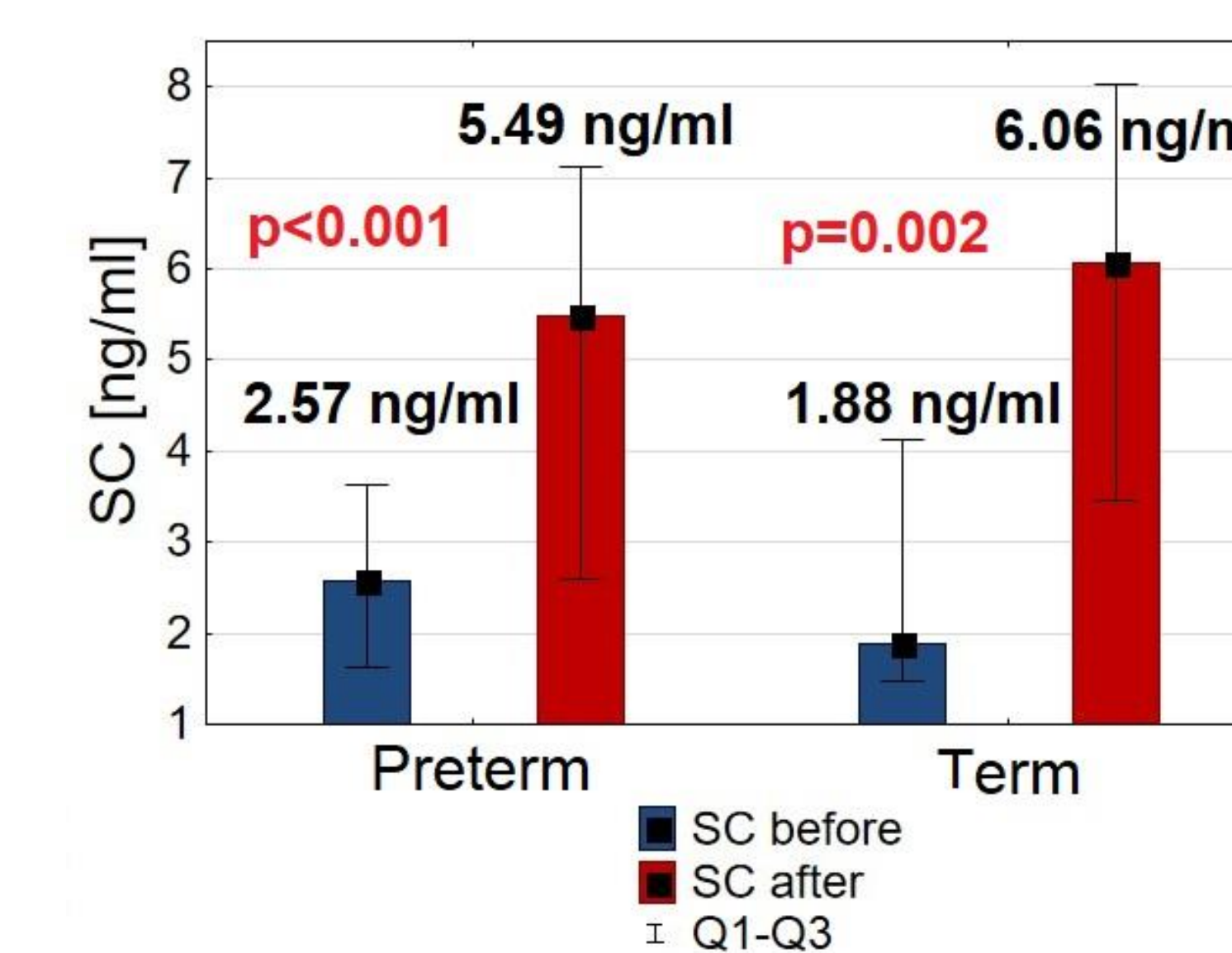
The median hospitalization time before analysis of morning SC was 7 days for term and 29 days for preterm children.

Term and preterm infants did not differ in the morning SC.

Perinatal factors, gender, hospitalization time, chronological age and PMA did not influence morning SC values.

In term infants morning SC was negatively correlated with total number of previously experienced blood samplings ($R_s = -0.45, p < 0.05$).

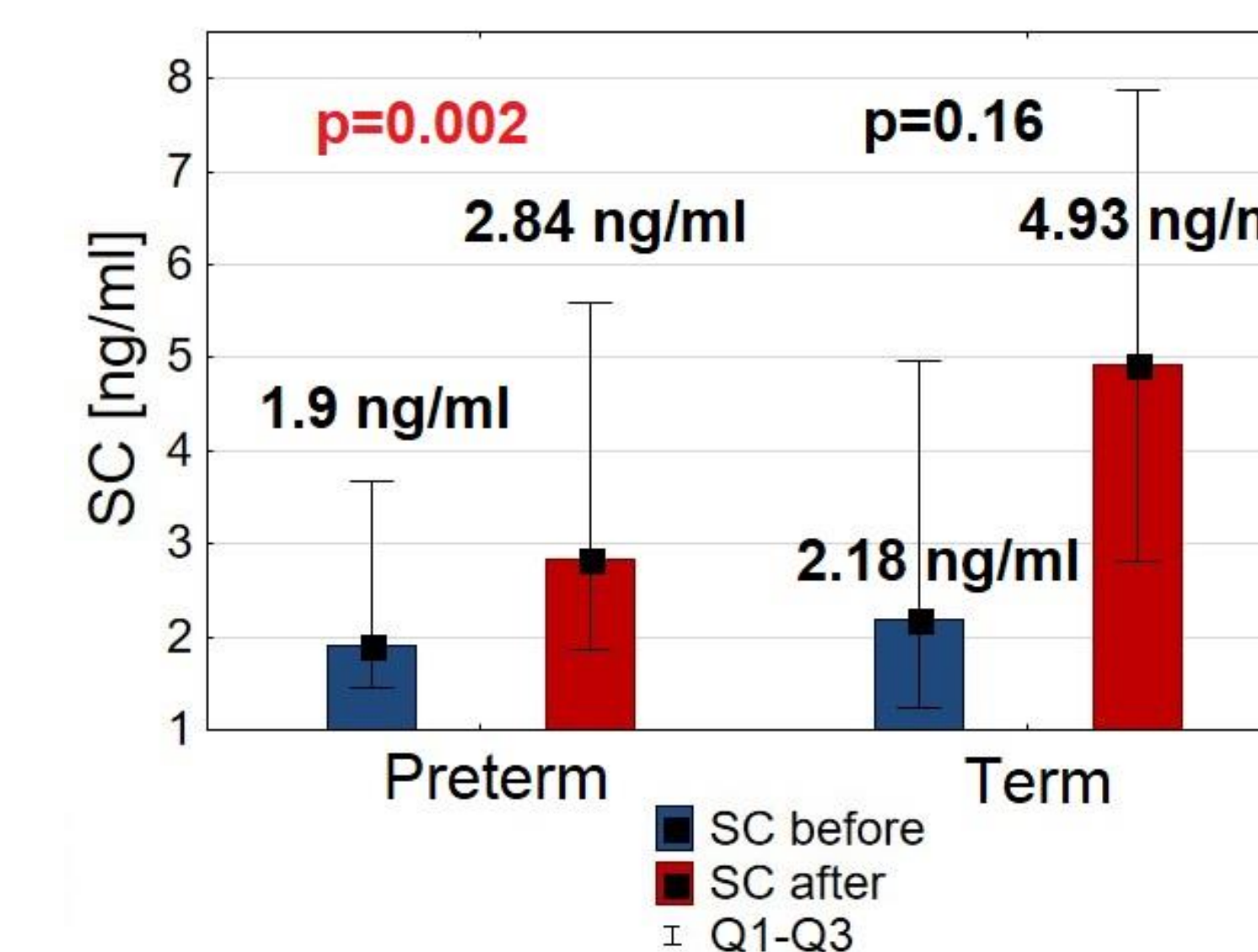
Figure 2. SC before and after blood sampling



The significant increase of SC after blood sampling was observed both in term and premature newborns.

There was no difference in SC increase after blood sampling between the analyzed subgroups ($p = 0.22$).

Figure 3. SC before and after nappy change



In premature children SC increase after nappy change was also statistically significant.

AIMS

1. Analysis of differences in morning concentrations of SC and its stress response between term and preterm children.
2. Evaluation of the influence of pain exposure related to hospitalization on HPA axis activity.

METHODS

Newborns hospitalized in ICU were assessed for the study. Preterm infants were enrolled after completion of 35 weeks of postmenstrual age (PMA), whereas term infants before being discharged home.

Saliva collection for morning SC:

- between 6 and 9 a.m.
- before routine nursing procedures
- at least 60 minutes after feeding
- collection time up to 10 minutes
- optimal sample volume 250 μ l

Photograph 1 and 2. Technique of saliva collection using SalivaBio Infant's Swab by Salimetrics



To investigate infants stress response additional saliva samples were collected 20 minutes after 2 types of procedures:

- nappy change (neutral),
- blood sampling (painful).

Each procedure was analyzed on the different day.

SC concentration was measured using radioimmunoassay (Cortisol, RIA CT).

CONCLUSIONS

1. Concentrations of morning SC did not differ between term and preterm infants.
2. In term infants activity of HPA axis might be altered by repeated painful stimuli.
3. Prematurity did not affect the response of HPA axis to painful procedure.

REFERENCES

1. Carbajal R, Rousset A, Danan C, Coquery S, et al. Epidemiology and treatment of painful procedures in neonates in intensive care units. JAMA - J Am Med Assoc 2008;300:60-70.
2. Grunau RE, Haley DW, Whitfield MF, Weinberg J, Yu W, Thiessen P. Altered basal cortisol levels at 3, 6, 8 and 18 months in infants born at extremely low gestational age. J Pediatr. 2007;150(2):151-156.
3. Forclaz MV, Moratto E, Pennisi A, Falco S, Olsen G, Rodríguez P, Papazian R, Bergadà I. Salivary and serum cortisol levels in newborn infants. Arch Argent Pediatr. 2017 Jun 1;115(3):262-266.

