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UNLOCK THE POWER OF PROBIOTICS FOR PREEMIES: A PROMISING STUDY

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INTRODUCTION

The microbiome plays a crucial role in infant health, with microbial colonization beginning immediately after birth. The mode of delivery and feeding practices significantly influence the establishment of the infant microbiota.

Infants born prematurely often exhibit altered microbiota composition, which can increase susceptibility to necrotizing enterocolitis.

There are still debates about probiotic use usefulness for premature babies. Human microbiome is a high demand topic of medicine but is less studied in neonates and preemies.

The research goal was to examine safety and efficacy of probiotic strain *Enterococcus faecium* L3 in very premature babies.

The probiotic strain *E. faecium* L3 has been extensively studied for its safety including whole genome sequencing and multiple clinical studies since 1997. An absence of pathogenicity genes and transferable genes encoding for antibiotic resistance was proved. Therefore, this strain was chosen to be studied on neonates.

Current research was mainly focused on very low birth weight (VLBW) premature babies, however a term babies microbiome was also characterized.

MATERIALS AND METHODS

The study included 94 newborn patients divided into two groups: full-term newborns (n = 39) and premature very low birth weight (VLBW) newborns (n = 55). Patients in both groups (full-term and preterm) received a liquid form of probiotic for three weeks. The fecal microbiota was analyzed using bacteriological examination and Real-time PCR to estimate the quantity of anaerobic and aerobic microorganisms.

RESULTS

The oral use of the probiotic *E. faecium* L3 strain in term infants and VLBW preemies promoted *Bifidobacteria* spp and *Lactobacilli* spp growth and reduced the proliferation of opportunistic bacteria. Significantly faster body weight gain and less feed intolerance over the period of probiotic use were noted in VLBW preemies. A significantly higher incidence of infections was observed in the non-probiotic group of children.

The unexpected finding was an increased antibiotic sensitivity of opportunistic microbes under the probiotic treatment. This microbial fitness needs further studies.

The pharmacoeconomic analysis established high cost-effectiveness of probiotic use.



CONCLUSION

The study was small and single-centered one with around 110 patients. Since the results were promising, larger multicenter clinical research is appropriate.
no conflict of interest



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GROWTH IN VERY LOW BIRTHWEIGHT (VLBW) NEONATES TUBE FED WITH 2 DIFFERENT AMOUNTS OF MILK DURING HOSPITALIZATION

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Introduction: VLBW neonates on tube feeding during hospitalization have usually an upper limit of milk volumes (either human milk or special formula) of 180-200ml/kg/d for optimal growth. There are some concerns that higher volumes are needed for achievement of optimal growth and neurodevelopment. This is a preliminary prospective study comparing two different feeding volumes in growth of VLBW hospitalized neonates.

Material and methods: A total of 36 VLBW neonates were fed either up to 200 or >200ml/kg/d after stopping TPN and up to the time of establishment of either breast or bottle feeding or till 36 weeks corrected age. Perinatal and postnatal parameters as well as anthropometrics were collected in several time points. A 1:2 randomization was made.

Results: Of 36 preterm neonates 12 were fed up to 200ml/kg/d (group A) and 24 >200ml/kg/d (group B). The two groups did not differ in BW, gestational age, sex. The mean birth weight of neonates was 1266gr in group A, 1290gr in group B and the mean gestational age was 29.8 weeks in group A (versus 29.3 wks in group B). The mean volumes of milk was 200ml/kg in neonates of group A, 272ml/kg in group B, with mean calories of 161kcal/kg and 220kcal/kg in group A and B respectively. No differences were found in incidence of sepsis, necrotizing enterocolitis, patent ductus arteriosus or BPD between the two groups. At 6 weeks postnatally the group B neonates had higher body weight (1982gr compared to 1887gr), while body length and head circumference did not differ.

Conclusions: Preterms fed >200ml/kg/d had higher body weight at 6 weeks postnatal but similar body length and head circumference. They did not present higher incidence of any morbidity during the same period. As these are preliminary results, higher sample and further follow up is needed to establish if higher milk volumes are beneficial in growth of VLBW infants.

We declare no conflict of interest.



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THERAPEUTIC POTENTIAL OF PHYSIOLOGICAL STARVATION: IMPACT OF NUTRITIONAL SUPPORT ON AUTOPHAGY AND INFLAMMASOME DYNAMICS IN AN LPS-INDUCED SEPSIS MODEL

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Introduction:

Sepsis is a critical medical condition characterized by dysregulated host responses to infections, necessitating urgent investigation into therapeutic strategies. This study aimed to elucidate the influence of nutritional support on autophagic activity and inflammatory markers in an experimental sepsis model induced by lipopolysaccharide (LPS) in rats.

Material and Method:

Thirty-five male Wistar albino rats were meticulously divided into three groups: a control group, an LPS-induced sepsis group, and an LPS-induced sepsis group with nutritional support. Sepsis was induced via intraperitoneal administration of LPS, while nutritional support was meticulously provided through orogastric tube feeding. Detailed assessments of sickness behavior, dynamic body weight changes, and molecular markers including NLRP3, Caspase-1, IL-1 β , Beclin, and LC3 were meticulously performed at specific time points to capture the intricate interplay between sepsis, nutritional support, and molecular responses.

Results:

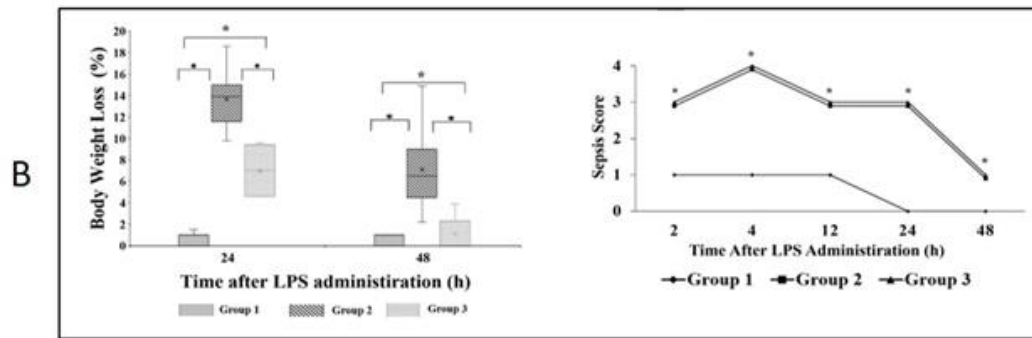
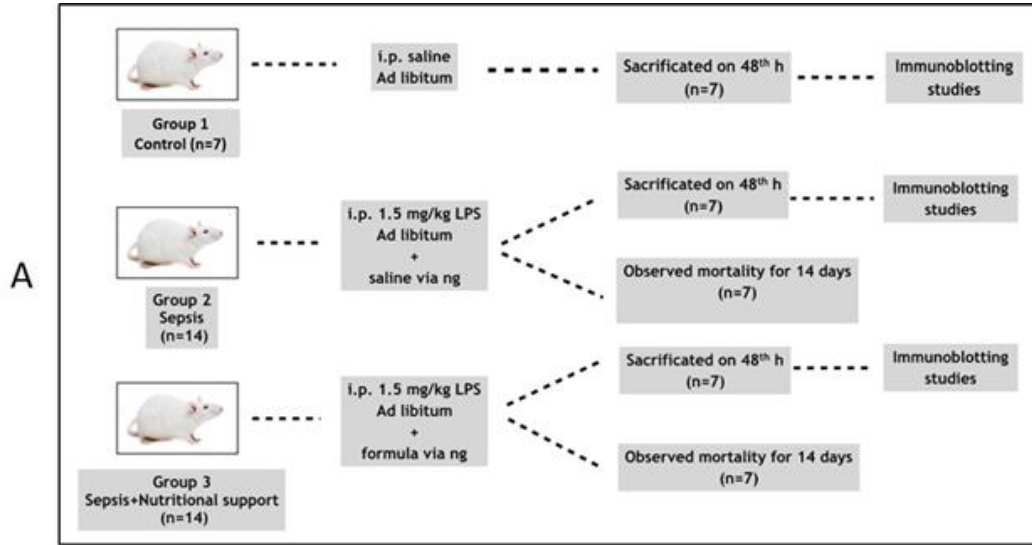
The induction of sepsis led to pronounced weight loss and escalated sickness scores, indicative of the severity of the septic state in the experimental model. Subsequent analysis of molecular markers revealed notable alterations, particularly in NLRP3 and LC3 levels. Intriguingly, nutritional support demonstrated a potential modulatory effect on these markers, suggesting a regulatory role in inflammasome activity and autophagy during sepsis. While NLRP3 exhibited significant differences among the experimental groups, other markers displayed nuanced responses, underscoring the complexity of the interactions between sepsis, nutritional support, and molecular dynamics.

Conclusion:

This study offers valuable insights into the complex interplay between sepsis, nutritional support, and molecular markers. The observed regulatory effect of nutritional support on the inflammatory response and autophagy during sepsis highlights the potential therapeutic implications of dietary interventions in septic conditions. Further investigations into the temporal dynamics and specific



pathways involved are warranted to fully elucidate these interactions and inform the development of targeted therapeutic strategies for sepsis management.
None declared



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	NLRP3/Actin	Caspase1/Actin	IL1 β /Actin	Beclin/Actin	LC3/Actin
Group 1	0,26 (0,12-0,89)	2,0 (1,29-6,31)	1,05 (0,46-3,41)	1,08 (0,34-2,26)	0,47 (0,26-0,73)
Group 2	0,80 (0,23-2,25)	2,55 (0,99-8,37)	1,66 (0,43-3,37)	1,72 (1,34-3,19)	2,73 (0,50-8,8)
Group 3	0,42 (0,11-0,80)	2,76 (1,46-8,06)	1,88 (0,92-3,37)	1,83 (0,57-2,90)	0,64 (0,26-1,06)
<i>p</i> ^b					
Group 1-2	0,011	0,630	0,365	0,227	0,073
Group 1-3	0,432	0,743	0,145	0,196	0,412
Group 2-3	0,010	0,880	0,454	0,932	0,189

*: Values are presented as median (min-max)

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Understanding the Impact of Gestational Diabetes on Colostrum Composition

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Introduction: Breast milk composition is widely recognized to be influenced by various factors such as duration of lactation, genetic predisposition, environmental factors and, to some extent, maternal diet and lifestyle. However, the specific influence of maternal health status on the nutrient content of breast milk remains largely unknown. Therefore, the aim of this study was to investigate whether gestational diabetes mellitus and the type of its management (dietary or insulin therapy) affects the macronutrient composition of breast milk, specifically colostrum, compared to colostrum from healthy non-diabetic mothers. In addition, the study evaluated the impact of other maternal factors, including concomitant comorbidities and demographic variables.

Materials and Methods: This case-control study included 70 participants of whom 21 were mothers with gestational diabetes treated by diet and exercise (GDM G2), 29 mothers with gestational mellitus treated with insulin (GDM G1) and 20 non-diabetic mothers as the control group. Colostrum samples were collected within the first seven days postpartum. Collected milk samples were analyzed for macronutrients using the Human Milk Analyzer (HMA) from Miris, Uppsala. As the database contained missing data, a method of multivariate imputation by chained equations (MICE) was implemented. Statistical analyses were performed using Shapiro-Wilk test, Kruskal-Wallis ANOVA, ANOVA, Chi-square test, regression analysis and cluster analysis.

Results: Colostrum samples collected from all participants were analyzed for total fat, total protein, carbohydrate, true protein, dry matter and energy. Analysis revealed significant differences in the concentrations of dry matter and energy between the study groups. Total protein and true protein concentrations varied based on maternal history of hypothyroidism, while other macronutrient concentrations remained similar. However, no significant differences in colostrum macronutrient composition were observed with respect to gestational weight gain, parity, history of hypertension, or nicotine use. In addition, no significant differences were found between diabetic mothers treated with diet and those treated with insulin.

Conclusion: The nutritional composition of colostrum appears to be influenced by maternal health status, particularly the concentrations of total protein, true protein, dry matter and energy. These differences may be due to the cumulative effects of coexisting conditions, especially if these conditions began before pregnancy.
None declared



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TIMING OF INTRODUCTION OF COMPLEMENTARY FEEDS IN INFANTS BORN PRETERM LESS THAN 35 WEEKS GESTATION: A RANDOMIZED CONTROL TRIAL

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INTRODUCTION

Evidence regarding the optimal timing of introduction of complementary feeding in preterm infants is scarce. Different studies have evaluated different anthropometric parameters with the timing of weaning.

The studies from developed countries demonstrate better growth with an earlier introduction of complementary feeding but studies done in developing countries show an increased risk of infection and similar growth with an earlier introduction of complementary feeding.

The age-old question of whether the complementary feeds need to be initiated at 6 months corrected or chronological age still remains unresolved.

MATERIAL AND METHODS

From Jan '20 to Dec'21 preterm babies born between 26-34 weeks of completed gestation & discharged before 44 weeks 0 days postmenstrual age were eligible for the study.

Eligible infants were tracked from birth and randomly assigned (1:1) at 6 months chronological age to receive complementary feeding at 6 months chronological age (Group-B), or continuation of milk feeding and initiation of complementary feeding at 6 months corrected age (Group-A), using computer generated randomization schedule of variable block size.

Participants and primary caregiver could not be masked to group assignment, but outcome assessors were masked.

Primary outcome was anthropometric parameters for age (Z-score) at 6 months after introduction of complementary feeding based on WHO MGRS. Analyses were by intention to treat.

Results:

The present study enrolled & randomized a total of 91 infants. Out of these, 46 infants were randomized to the corrected age group(Group-A) for starting complementary feeds, while 45 infants were randomized to the chronological age(Group-B).

The babies in the Group-B had a significantly better length for age z score (HAZ) scores at the start of complementary feeding [MD(-1.18)] & after 6 months [MD (-0.71)], with statistically significance (p-0.001).

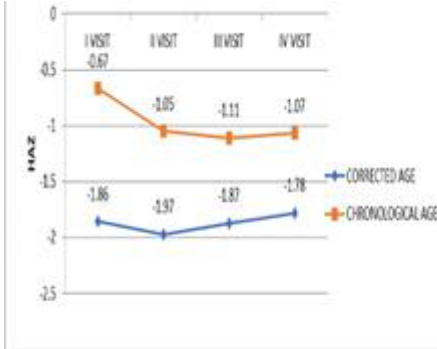
The babies in the Group-A had significantly less weight (WAZ score-1.66z) at the start, compared to Group-B (WAZ score-1.02 z), (p-0.02), but there was no significant difference after 6 months. No significant difference in other outcome parameters was detected in both the study groups.

CONCLUSION



Preterm infants between 26 0/7 to 34 6/7 weeks of gestation started on complimentary feeding at 6 months chronological age achieve better linear growth.

None declared



Length for age (z scores) HAZ	Corrected age (n=46)		Chronological age (n=45)		Mean difference	95% C. I		Unpaired t-test P-value
	Mean	SD	Mean	SD		Lower limit	Upper limit	
1 st visit	-1.86	1.22	-0.67	1.24	-1.18	-1.69	-0.67	<0.001
2 nd visit	-1.97	1.15	-1.05	1.18	-0.91	-1.39	-0.42	<0.001
3 rd visit	-1.87	1.16	-1.11	1.04	-0.76	-1.22	-0.30	0.001
4 th visit	-1.78	1.05	-1.07	1.01	-0.71	-1.14	-0.28	0.001



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Postnatal weight gain as an early predictor of retinopathy of prematurity development

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Introduction

Retinopathy of Prematurity (ROP) is a postnatal disorder of retinal vessels that develops in the incompletely vascularized retina of preterm infants. ROP is a biphasic disease with multiple underlying causes. The purpose of this study was to determine whether postnatal weight gain during the first three weeks of life can predict the development of ROP.

Materials and Methods

A prospective cross-sectional study that included 88 preterm infants with a gestational age ≤ 32 weeks was performed in the level III neonatal intensive care department at the University Clinic of Gynecology and Obstetrics in Skopje, which is the main regional center for transport in utero. Daily weight measurements were obtained during the first three weeks of life, and weight gain was correlated with the development of ROP. A specific training ophthalmologist in the diagnosis of ROP performed the ocular examination between the 4th and 6th weeks postpartum. Data were analyzed using two statistical programs: Statistica 7.1 for Windows and SPSS Statistics 23.0. The probability of a p-value less than 0.05 was considered significant.

Results

At three weeks of age, there was a significant difference in the weight of the ROP and no ROP groups ($1278,48 \pm 359,81$ g and $1715,45 \pm 262,69$ g, respectively; $p < 0,05$). The ROP group had a significantly lower mean weight ($z = -5,56$ and $p < 0,001$) than the no ROP group. The ENTER model was applied to determine the predictive values of weight gain at the age of 3 weeks. The global accuracy of the model to predict ROP was 75.0%, with a sensitivity of 80.4% and a specificity of 69.40%. The prognostic accuracy of the ROC curve was 0,844.

Conclusion

An early postnatal weight growth analysis can be used to identify newborns who are at a high risk of having treatable ROP. This can be incorporated into a novel noninvasive preclinical screening method to help identify premature infants who are not at risk and focus treatment on those who are at high risk for ROP. This can optimize follow-up and potentially lower the overall number of traumatic diagnostic eye exams.

Key words

Retinopathy of prematurity, early postnatal weight gain, premature infants

None declared