



September 16th, 2021 15:00 - 17:00

PARALLEL SESSION 18 - EFCNI 3 NUTRITION

ID 200. BOTH HYPERGLYCEMIA AND HYPOGLYCEMIA ARE COMMON NEARING TERM AGE IN VERY LOW BIRTH WEIGHT INFANTS - RESULTS FROM THE LIGHT STUDY

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Background: Hyperglycemia as well as hypoglycemia are common during the first weeks of life in very low birth weight infants (VLBW; < 1500 g). These disturbances have been associated with adverse outcomes such as mortality and neurodevelopmental disabilities. However, glucose concentrations are seldom controlled for at later stages of the admission period, nearing term age. This study aimed to assess the prevalence of and risk factors for glucose disturbances in VLBW infants at PMA 36 weeks.

Methods: The Very Low birth weight infants - glucose and hormonal profiles over time (LIGHT) study is a prospective observational cohort study that included 50 VLBW infants born during 2016-2019 and admitted to the tertiary neonatal intensive care unit at Umeå University hospital, Sweden. Perinatal and glucose data were registered prospectively during the admission period. Continuous glucose monitoring (CGM) was performed in 35 (70%) of the infants during a period of 48 hours at PMA 36 weeks. Protracted hyperglycemia and hypoglycemia episodes in the CGM registration were defined as glucose values > 8 mmol/L and < 2.6 mmol/L, respectively, lasting for at least 30 minutes.

Results: Analyzing a total of 19907 glucose measurements registered at PMA 36 weeks, 54% of the infants experienced protracted hyperglycemia, 29% experienced protracted hypoglycemia, and 37% experienced no protracted episodes of glucose disturbances. Infants who had protracted hyperglycemia at PMA 36 weeks were more likely to have had amnionitis and prior hyperglycemia and hypoglycemia during the admission period. Longer hyperglycemia episodes were registered at PMA 36 weeks in male infants compared to females. Lower Apgar scores at 10 min and prior hyperglycemia during the admission period were significantly associated with more time spent in hypoglycemia at PMA 36 weeks.

Conclusion: Glucose disturbances were registered in nearly two thirds of VLBW infants nearing term age. Low apgar scores and hyperglycemia during the admission period are risk factors for hypoglycemia nearing term age. Male sex, amnionitis and glucose disturbances during the admission period are risk factors for hyperglycemia nearing term age. Screening for glucose concentrations during the entire admission period might be advised even in clinically stable infants.

None declared



ID 225. A NOVEL HIGH TEMPERATURE SHORT TIME PASTEURISATION TREATMENT FOR HUMAN MILK

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BACKGROUND

Holder pasteurisation (HoP) of human milk (HM) allows a 5-log₁₀-reduction in bacterial content but also destroys heat-labile bioactive components, hence the need of alternative treatment methods. We redesigned a high-temperature short-time (HTST) pasteurisation device and compared it to HoP in its ability to inactivate artificially inoculated bacteria.

METHODS

HoP pasteurised (62.5±0.5°C/30 min) HM aliquots were inoculated with 10⁵ colony forming units (CFU)/mL of *E. faecalis* (ATCC29212) and two isolates each of *L. monocytogenes* (218, 15) and *C. sakazakii* (RV5-I-92, RV00078). Inoculated aliquots underwent HoP (S90, Sterifeed, UK) or HTST at 62°C or 81°C for 5s in a modified bulk device that was originally designed for Cytomegalovirus inactivation (Virex, Lauf, Germany) by rapidly heating a thin milk layer within a rotating flask with hot air. We inoculated Columbia blood agar with 100µl of each treated and various control samples and determined CFU/mL by MALDI-TOF-spectroscopy, after culturing the samples for 24 and 48h, lower limit of detection was <10 CFU/mL. Bacterial counts were analysed by using a one-sample T-test (GraphPadPrism), p<0.05 was considered significant.

RESULTS

Post-incubation colony counts were 5.8x10⁴ for *E. faecalis*; 1.4x10⁵ for *C. sakazakii* RV00078, 2.1x10⁵ for *C. sakazakii* RV5-I-92; 1.8x10⁵ for *L. monocytogenes* 218 and 1.1x10⁵ for *L. monocytogenes* 15. HoP yielded no growth (>4.76 log₁₀-reduction) for all cultures. HTST at 62°C/5s achieved a reduction of max. 1.93 log₁₀ (HTST 62°C vs. HOP, p=0.0076). HTST at 81°C/5s allowed a 3.32-5.32 log₁₀-reduction of all inoculated bacteria. There was no significant difference in bacterial count reduction between HoP and HTST at 81°C s for all tested strains (p=0.29). Only *E. faecalis* could be cultured after 81°C/5s (log₁₀-reduction 3.32).

CONCLUSION

We previously demonstrated the retention of bioactive HM components after HTST at 62°C/5s but were unable to achieve a 5-log₁₀-reduction of bacteria. This study aimed at defining an appropriate HTST time-temperature-curve to obtain reliable bacterial count reductions. HTST at 81°C/5s is a promising alternative to HoP in its ability to destroy bacteria across a range of heat tolerance spectra. The retention of bioactive HM components after HTST is currently being investigated.

None declared



ID 226. IMPROVED PRESERVATION OF HUMAN MILK PROTEINS BY AUTOMATED WATER BATH PASTEURISATION COMPARED TO DRY TEMPERING

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BACKGROUND

Pasteurisation of human milk at 62.5±0.5°C for 30 min (Holder pasteurisation, HoP) leads to an exposure-dependent reduction of protective and nutritive human milk (HM) proteins. Recently, aluminium block thermostats (dry tempering, DT) were introduced for HoP replacing traditional water baths (WB). However, since heating profiles differ between DT and WB pasteurisation and prolong the pasteurisation process, we hypothesised that DT results in even lower protein retention rates compared to WB pasteurisation.

METHODS

HM of 15 donors was aliquoted to 60 mL samples each. Samples were either left untreated or Holder pasteurised using a WB (S90, Sterifeed, UK) or a DT device (clinitherm pasteur, Barkey, Germany). All samples were then appropriately prepared using repeated steps of centrifugation and filtration. We determined concentrations of secretory immunoglobulin A (sIgA) and lactoferrin in the resulting milk whey (SimpleStep ELISA-Kit, Abcam, UK). Samples were handled and tests were performed in a thermo-controlled and digitally recorded environment. All pasteurisation procedures were carried out in triplicates, protein determinations in duplicates resulting in 6 x 15 (sIgA) and 6 x 8 (lactoferrin) values per protein and procedure for statistical evaluation (ANOVA and T- or rank-sum test where appropriate (GraphPadPrism V8)).

RESULTS

In the untreated human milk Mean (SD) concentration of sIgA was 0.29 (0.18) g/L (100%) and mean (SD) concentration of lactoferrin was 21.1 (7.21) g/L (100%). Mean (SD) sIgA retention rates after WB pasteurisation were 73.2±1% and mean (SD) sIgA retention rates after DT pasteurisation were 57±1% (p=0.002). Mean (SD) lactoferrin retention rates after WB pasteurisation were 45.2±2% and mean (SD) lactoferrin retention rates after DT were 23.4±8% (p=0.06).

CONCLUSION

WB pasteurisation displays an increased protein preservation of IgA and lactoferrin compared to DT pasteurisation. We attribute this to the shortened heating phase due to more efficient heat conduction in WB compared to DT. For hygienic aspects and reasons of practicability, dry tempering devices are sometimes preferred over water containing devices. However, our data show that DT devices may be inferior to WB pasteurisation in terms of HM quality. We are currently investigating the retention of further HM proteins.

None declared



ID 344. Controlled trial of two timepoints for introduction of standardized complementary food in preterm infants

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Background

In term infants it is recommended to introduce solids between the 17th and 26th week of life, whereas data for preterm infants are missing. Aim of the study was to investigate the impact of timepoint for introduction of standardized solid foods on growth of VLBW (very low birth weight)-infants.

Methods

In a prospective, two arm intervention study we investigated longitudinal growth of VLBW-infants after early (10-12th) or late (16-18th week of life) introduction of standardized complementary food (Figure 1). Primary objective was length at one year of age, secondary objectives were other parameters of growth such as weight, head-circumference, BMI, and z-scores.

Results

Among 177 infants who underwent randomization primary outcome could be assessed in 80 (90%) assigned to the early and 75 (85%) to the late group. Mean birthweight was 940g (± 253 g) in the early and 932g (± 256 g) in the late group, mean gestational age at birth was 27+1 weeks in both groups. At one year of age corrected for prematurity length was 74.7cm (=mean; SD ± 2.7 cm) in the early and 74.4cm (=mean; SD ± 2.8 cm; n.s.) in the late group. There were no differences in other anthropometric parameters between the study groups except for weight z-score at 6 months corrected for age (early group - 0.49; SD ± 1.2 , late group -0.56; SD ± 1.04 ; p=0.04).

Conclusions

There was no significant difference in anthropometric parameters at one year of age in VLBW-infants with a strategy of early introduction of standardized solids between 10-12 weeks as compared to late introduction between 16-18 weeks. Starting solids should be rather related to neurological ability of the infant than to considerations of nutritional intake and growth.