HYPERICUM - NON-PHARMACOLOGICAL POSSIBILITY TO RELIEVE THE NEONATAL PAIN

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Abstract: The diagnosis and treatment of neonatal pain are aimed at preventing its adverse early and late effects. The control of procedural pain in newborns is an ethical act and requires treatment. Recent studies show the risks of one side of untreated neonatal pain and the other of aggressive analgesic practice. The accent is on the usage of non-pharmacological agents. These include homeopathic remedies. Their use during the neonatal period is based on their good tolerability, efficiency and high level of safety.
Aim: To establish and compare the analgesic effect of Hypericum D6 and Sol.Glucosae 25% on the procedural pain caused by the heel-stick of the newborn.
Material and methods: We studied 147 term infants divided into three groups: control group without analgesia (A) n = 67; treated with Hypericum (B) n = 40 and Sol.Glucose 25% (C) n = 40, aged 72-84h, birth weight 3252,41±375,79 ,with no perinatal asphyxia data. The pain was evaluated by NIPS(Neonatal Infant Pain Scale) before, during and after the procedure 30 seconds and 5 min with video surveillance. Additionally, the heart rate, tSpO2, blood pressure before, 30 seconds, 5 minutes and 12-24 hours were monitored. after screening. The following statistical methods were used: Kruskal-Wallis Test; X2 assay (Chi-squared test); t-criterion of Student, u-Mann Whitney criterion, at level of significance ($p < 0.05$).
Results: Immediately after the procedure (at 30sec), the severity of the pain did not differ significantly in the three groups. When comparing them to 5 minutes. there were credible differences between the total values correlated with the severity of pain between A and B and A versus C. The children in the two groups receiving analgesia showed lower levels of pain response compared to those in the control group. The comparison between B and C groups did not prove any differences, regardless of the lower degree of pain perceived by Hypericum.The largest variations between the groups were found in heart rate monitoring during the follow-up periods. Oxygen saturation showed no statistically significant differences in the measurements immediately and 5 minutes after the heel-stick. Significant changes in systolic and diastolic blood pressure were recorded only in interval 12-24 hours.
Conclusions: Hypericum D6 has an analgesic effect similar to that of Sol.Glucosae 25% and complements the spectrum of non-pharmacological methods used to control the procedural pain in newborns.
Keywords: newborn, procedural pain, non-pharmacological methods, homeopathy

INTRODUCTION

In their postnatal development, newborns are often under the influence of procedural, recurrent and prolonged painful stimuli that are part of routine care for them.The efforts of clinicians are focused on the prevention, diagnosis and treatment of neonatal pain.Independent or combined non-pharmacological and pharmacological methods are used.The first are an initial step to adequate influence on the early and late effects of neonatal pain on one hand, and on the other to provide comfort and calmness to the mother and the newborn. Due to the absence of side effects in neonatal practice, non-pharmacological analgesic techniques for the reduction of the pain stimulus associated with a particular procedure are increasingly preferred. Homopathic preparations that are used in certain clinical conditions in neonatology are also included in this group.

AIM

To establish and compare the analgesic effect of Hypericum D6 and Sol.Glucosae 25% on the procedural pain caused by the heel-stick of the newborn.

MATERIAL AND METHODS

The study is prospective. We studied 147 term infants, divided into three groups: control group - without analgesia A) n = 67, treated with Hypericum (B) n = 40 and Sol.Glucosae 25% (C) n = 40, aged 72-84h,birth weight 3252.41 ± 375.79 without data on perinatal asphyxia. The born per vias naturalis were 55 children (37.41%), 89 (60.54%) - by cesarean section and 3 (2.04%) by vacuum extractor. Via video surveillance before, during and after the procedure, the weight of procedural pain was estimated by NIPS (Neonatal Infant Pain Scale). Additionaly the heart rate , blood pressure , transcutaneous saturation (tSpO2) were monitored with a Biocare iM / 2014 monitor.The results are reported in: 30th c. and at the 5th minute after the penetration of the heel as well as in the subsequent interval 12-24 hours. In neonates from group B for anal- gesia, Hypericum D6 per os was administered as an individual solution of three pills in sterile water. Each dose is 1 ml. The first one is after the heel-stick and the rest - at the second hour and in the interval 12 - 24 hours after the procedure. In group C infants with analgesia is performed by oral administration of Sol.Glucosae25% 2ml, 2min before procedure The results obtained were statistically analyzed by a descriptive analysis, Chi-squared test (X2), Mann-Whitney (U-test) of significance $p < 0.05$ and are presented graphically in tables and figures

RESULTS

The mean values of the individual indicators and the total assessment of the severity of the proce- dural pain at the 30th second after the pricking the heel of the newborn are not different in the three groups

When comparing all the parameters between the three groups at 5 minutes after the procedure, lower values were found in groups B and C /with analgesia/. The tracking of the individual indicators and the overall scores from the scale reflected in table 1 consisted of credible differences in: facial expressions (A/B, A/C), crying (A/B) hand movment (A/B, A/C) ; leg movment (A/B,A/C); sleep/waiking - (A/B) and overall assessment (A/B,A/C). It is noticeable that breathing is not affected by analgesic agents .[Table 1]

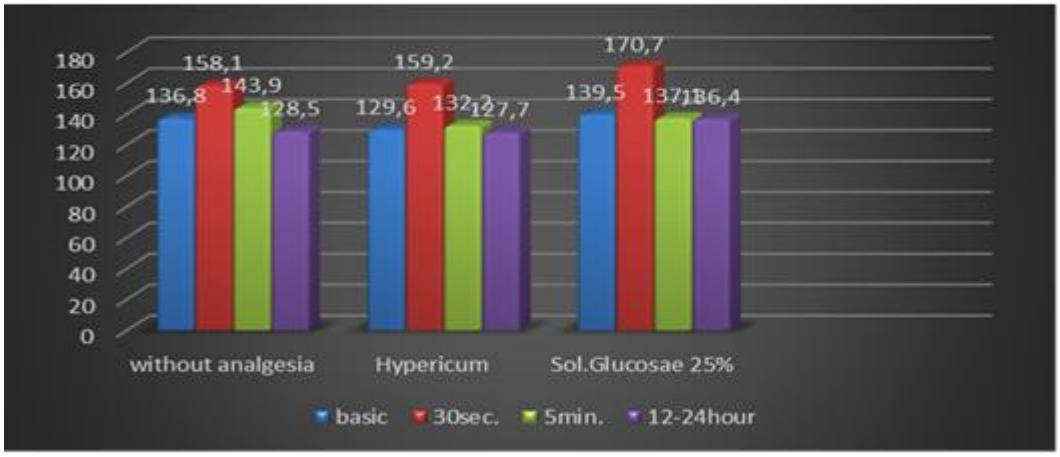
Table 1. Evaluation of observed NIPS scale at 5 min. depending on analgesia method.

Legend: A- without analgesia; B-with Hypericum ;C- with Sol.Glucose 25%

NIPS-5 min.		N	Mean	Std. deviation	Ratio	P
Face expression	without analgesia	67	0.73	0.449	A/B	**0.001**
	Hypericum	40	0.40	0.496	A/C	**0.002**
	Sol. Glucose 25%	40	0.43	0.501	B/C	0.817
Crying	without analgesia	67	0.90	0.837	A/B	**0.001**
	Hypericum	40	0.36	0.628	A/C	0.101
	Sol. Glucose 25%	40	0.63	0.868	B/C	0.152
Breath	without analgesia	67	0.73	0.447	A/B	0.254
	Hypericum	40	0.63	0.490	A/C	0.639
	Sol. Glucose 25%	40	0.78	0.423	B/C	0.151
Movement of hands	without analgesia	67	0.85	0.359	A/B	**0.001**
	Hypericum	40	0.48	0.506	A/C	**0.006**
	Sol. Glucose 25%	40	0.60	0.496	B/C	0.220
Movement of legs	without analgesia	67	0.84	0.373	A/B	**0.001**
	Hypericum	40	0.45	0.504	A/C	**0.010**
	Sol. Glucose 25%	40	0.60	0.496	B/C	0.138
Sleep/waking	without analgesia	67	0.33	0.475	A/B	**0.022**
	Hypericum	40	0.13	0.339	A/C	0.345
	Sol. Glucose 25%	40	0.25	0.439	B/C	0.220
Overall Assesment	without analgesia	67	4.37	2.187	A/B	**0.001**
	Hypericum	40	2.40	2.240	A/C	**0.025**
	Sol. Glucose 25%	40	3.28	2.552	B/C	0.108

Study the dynamics of the heart rate established: Prior to the procedure, higher values were for control (A) and glucose-treated (C) analgesia compared to the Hypericum group and the confidence in B/C($p = 0.036$) [Figure 1]

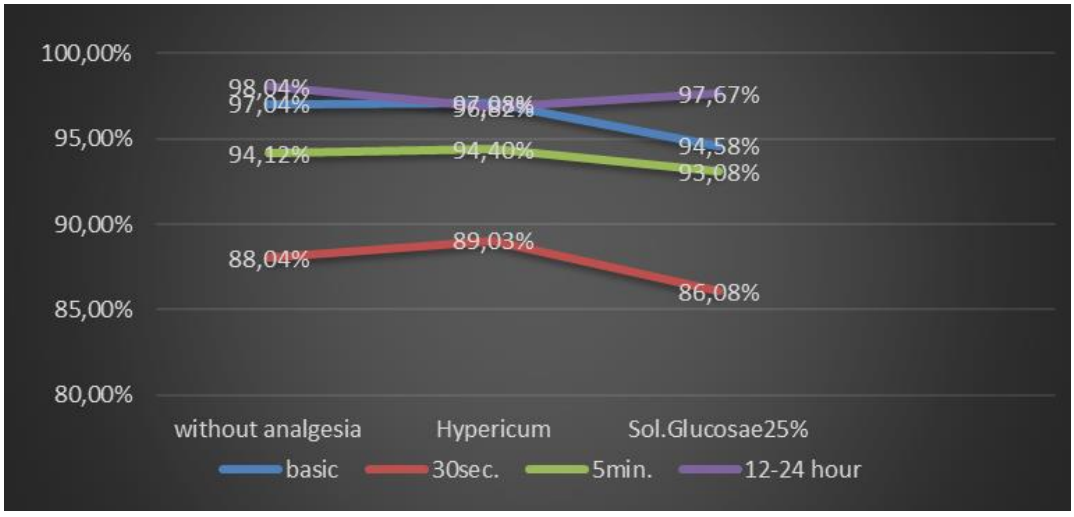
Fig.1 Registered heart rate in the comparative groups of infants



In **30 seconds**, a higher heart rate is seen in newborns who have taken glucose than in controls and those with hypericum whose levels are the same with a statistically significant difference between A/C (p = 0.025); in **5 min.**, a decrease in the physiological marker of pain was observed in the three groups. This is more pronounced in painless newborns, with lower levels for those receiving Hypericum (p = 0.05) with credibility for A/ B. In the interval **12-24h**. heart rate is lower in neonates with Hypericum and those without analgesia. Highest value (within reference ranges) is reported in the glucose group.The changes are significant in the comparison of A/C (p = 0.002) and B / C (p = 0.001). [Figure 1]

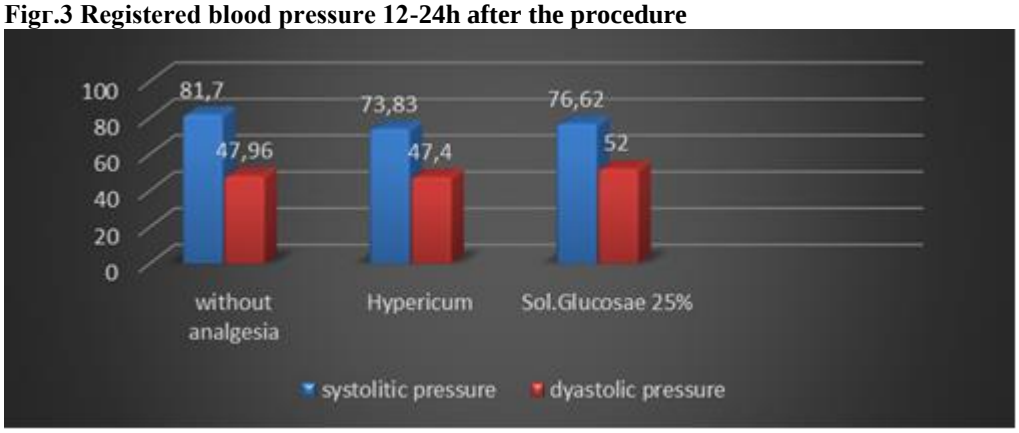
The transcutaneous monitoring of oxygen saturation found:
-before the procedure lowest levels are received glucose newborns with significant results for-A/C (p = 0.05) and B/C (p = 0.01; **30sec**. the highest saturation was measured in the patients receiving Hypericum and the lowest in the glucose recipient; in the **5th minute**, there was a better recovery in the hypericum groupa (B) ; in the interval **12-24h**. the control group is presented with the highest levels and confidence in differences in A/C (p = 0.002) and B/C (p = 0.001). [Figure 2]

Fig.2 Oxygen saturation in the comparative groups of newborns



Blood pressure testing did not show significant differences between the groups in systole and diastole before the procedure at **30sec**. and **5 min**. Before the procedure the highest starting systolic value is found in glucose recipients The five highest prone systolic values were found in the systolic blood glucose, and for the diastole in the control group. Newborns with Hypericum have higher systole and diastole values at 30 sec. and 5 min. There are a dependence on systolic blood pressure monitoring in the interval **12-24 hours** between control group and those treated with Hypericum-A/B (p = 0.01) and 25% glucose-A/C = 0.027).With regard to the diastolic pressure in the period **12-24 hours**, valid differences exist at A/C(p = 0.015) and B/C (0.002).[Figure 3]

Figr.3 Registered blood pressure 12-24h after the procedure



DISCCUSSION

The exact assessment of the pain experienced by the fetus or the newborn is difficult, as it is defined as a subjective notion [8]. Anand K. (1998) considers that newborns have an increased sensitivity to pain compared to other age groups [2].Studies show that controlling it in the newborn is beneficial, leading to the elimination or improvement of its behavioral, physiological and hormonal markers [1]. The first two types of markers are the basis of scales for diagnosing and evaluating pain stimulus.Behavioural responses to acute pain include: a flexion response to withdrawal, a change in face expression, open mouth, crying, and complex behavioural changes - in the sleep / wake cycle , increased irritability, etc.The physiological parameters refer to the variations in heart rate, breathing, blood pressure and oxygen saturation, sweating of the palms associated with changes in the sympathetic nervous system [7].

In the post-natal period for diagnostic or therapeutic purposes, children may be subject to multiple invasive medical interventions - venipuncture, endotracheal intubation, eye examination, lumbar puncture, taking blood from the heel , etc.Impact of the heel is considered the third in intensity of pain procedure in intensive care units and represents 79.2% of all painful manipulations performed without analgesia [9].Under the influence of frequent and recurrent intense pain stimuli, the neonatal system in newborns can be easily modified in the wrong way. Pain can cause a variety of side effects.Early consequences lead to increased cortisol response, tendency to infections, increased intracranial pressure [9,7], and late ones can unlock behavioral and emotional problems in childhood, suicidal tendencies, motor and cognitive impairment [9]. Reducing neonatal pain by 15-20% is clinically important for the child [7].

To reduce the pain of pricking the heel in newborns, different non-pharmacological techniques are used before and during the procedure: flexion position of the limbs, swinging, massage, oral administration of a sweet solution, music therapy,"Kangaroo" care, non-nutritive sucking, contact with mother / speech, caress /, homeopathic remedies [9,5]. Sweet solution is a commonly used agent for managing procedural pain. It suggests that its effect is associated with the release of endogenous opioids , dopamine and acetylcholine[9,5]. The relationship between the analgesic effect and the glucose concentration is investigated. It has been found that dose is important and good analgesia is achieved with 25% solution [10]. Clinical studies, as well as our study, find that glucose reduces crying, grimacing, heart rate [6,9,10], but also leads to a decrease in transcutaneous saturation [6,10].Kohranen in 2013 , notes that sucrose is safe and effective to reduce procedural pain as a result of a heel prick of newborn babies[9].

In search of additional possibilities for its non-pharmacological response in the neonatal period, the choice of Hypericum Perforatum is based on its composition. The flavonoid glucocorticoids have an analgesic, anti-inflammatory, regenerating effect, phytoncides - antibacterial action, and routine and vitamin P - have antihemorrhagic properties. The preparation is preferred as a non-pharmacological option due to data in clinical neonatology, obstetrics and pediatric practice for the treatment of injuries to the peripheral and central nervous system, open wounds, burns, pricking, stinging, using forceps, birth by the mechanism of normal delivery other conditions accompanied by various degrees of pain. [3,4].

According to the results of the current study, the use of Hypericum to reduce the severity of procedural pain as a result of pricking the heel of the newborn changes the behavioral markers of pain to a greater extent in comparison with the physiological ones. We suppose this is related to the higher sensitivity and lability of the behavioural markers.

The limited influence of Hypericum on vital signs may also be due to its use pattern. It includes the last admission that coincides with the follow-up period of 12-24 hours. We can not exclude the role of the pain stimulus itself. In our available literature, we have not found any studies in this regard.

CONCLUSSIONS

1. Hypericum D6 has an analgesic effect similar to that of Sol.Glucosae25%. Both methods primarily influence the behavioural pain markers included in the NIPS.
2.Hipericum impacts to a lesser extent on vital signs: heart rate, transcutaneous saturation and RR compared to Sol.Glucosae25%
3. The administration of Hypericum supplements the group of non-pharmacological agents used to treat procedural pain in term neonates.

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