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ECG MONITORING DURING NRP: A FALSE SENSE OF SECURITY?

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PRIMARY SUBJECT AREA: Neonatal-Perinatal Medicine

BACKGROUND: During neonatal resuscitation, use of an electrocardiogram (ECG) provides a more reliable measurement of heart rate than auscultation or pulse oximetry. Having an ECG monitor may, however, provide a false sense of security in the unlikely scenario of a newborn with pulseless rhythms. This could delay critical resuscitative steps during neonatal resuscitation.

OBJECTIVES: The aim of this study is to evaluate whether the presence of ECG monitoring has an impact on the resuscitative steps of neonatal resuscitation providers.

DESIGN/METHODS: We conducted a prospective crossover randomized controlled trial, which took place at Sainte-Justine University Health Center in Montreal, Quebec, Canada. Residents, fellows, attending physicians, transport nurses, and respiratory therapists were recruited in teams of three. They participated in two simulation scenarios (pulseless electrical activity [PEA] with and without ECG monitoring). Teams were randomized to one of the scenarios and then crossed over. A debriefing session followed the two scenarios. All sessions were video-recorded. The primary outcome was the time to pulse check once the simulated mannequin was programmed to become pulseless. Secondary outcomes were the number of pulse checks, time to intubation, time to start of chest compressions, and time to administration of epinephrine.

RESULTS: Preliminary results (n=5 groups, 10 scenarios) showed that the time to check the pulse once the mannequin was pulseless was longer when ECG electrodes were used (98.0 vs 55.6 sec, p = 0.07). There was a statistically significant decreased number of pulse checks with the ECG compared to without (2.4 vs 5.6, p = 0.004). Time to start of positive pressure ventilation (31.3 vs 27 sec), intubation (182.4 vs 179.2 sec), chest compressions (235.2 vs 227.6 sec), and epinephrine administration (340.8 vs 241.5 sec), were all increased in the presence ECG monitoring, but the difference between groups was not statistically significant.

CONCLUSION: ECG monitoring may alter the behaviour of individuals and delay recognition of a pulseless state, but preliminary data suggest that clinical endpoints are not affected.

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ASSESSMENT OF PAIN AND PROVISION OF NON-PHARMACOLOGIC ANALGESIA TO CHILDREN BY PREHOSPITAL PROVIDERS IN SOUTHWESTERN ONTARIO: A CROSS-SECTIONAL STUDY

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PRIMARY SUBJECT AREA: Emergency Medicine - Paediatric

BACKGROUND: There is abundant evidence that provision of pharmacologic analgesia by prehospital providers to children is suboptimal. Most paediatric calls are performed by primary care paramedics (PCPs) who are unable to administer pharmacologic analgesia to children but can administer non-pharmacologic therapies.

OBJECTIVES: Our objective was to describe the provision of non-pharmacologic analgesia to children by prehospital providers.

DESIGN/METHODS: We reviewed all ambulance call reports (ACRs) of children 0-17 years with acutely painful conditions (headache, abdominal pain, injury, head/ears/eyes/nose/throat pain, and back pain) who were transported to a paediatric tertiary referral centre serving a catchment of > 1 million from 2017-2019. Data collection was recorded by two blinded assessors using a study-specific Excel™ sheet. The primary outcome was the proportion of children offered non-pharmacologic analgesia. We performed a stepwise logistic regression on the primary outcome using covariates defined *a priori*: age, sex, visible deformity, type of crew, complaint, pain score, call time, and prior analgesia.

RESULTS: All 11,084 ACRs from January 1, 2017 to December 31, 2019 were reviewed. The sample included 5887/11084 (53.1%) males, ranging from 1 month to 17 years, with a mean (SD) age of 10.5 (5.6) years. Calls involved mainly PCPs [8576/11084 (77.4%)]. Non-trauma-related musculoskeletal injuries were most common, comprising 2743/11,084 (24.7%) of calls. Pain scores were documented in 6947/11084 (62.7%) of calls. The verbal numeric rating scale (0-10) was used in 5022/6947 (72.3%) of calls, with a mean (SD) score of 5.2 (3.2). Non-pharmacologic analgesia was provided in 2926/11084 (26.4%) of calls, most commonly splint (1115/2926, 38.1%) and ice (931/2926, 31.8%). Pharmacologic analgesia was provided in 458/11084 (4.1%) of calls. In the multivariate model, mild (OR: 3.2; 95% CI 2.3-4.4; p < 0 .001) and moderate pain (OR: 1.7; 95% CI 1.3-2.2) (versus no pain) were significant predictors of non-pharmacologic analgesia, whereas visible deformity (OR: 0.5; 95% CI 0.3-0.6; p < 0 .001) was a significant negative predictor.

CONCLUSION: The provision of non-pharmacologic analgesia to children in Southwestern Ontario by prehospital providers is suboptimal, despite moderate to severe pain. There is a clear need for education surrounding approaches to non-pharmacologic analgesia in children among prehospital providers.

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CAREGIVER-REPORTED DELAY IN PRESENTATION TO PEDIATRIC EMERGENCY DEPARTMENTS FOR FEAR OF CONTRACTING COVID-19: A MULTINATIONAL CROSS-SECTIONAL STUDY

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PRIMARY SUBJECT AREA: Public Health and Preventive Medicine

BACKGROUND: Visits to pediatric emergency departments have decreased up to 75% during the pandemic, with corresponding increases in high acuity visits, inpatient admissions, and intensive care unit admissions compared to historical cohorts.

OBJECTIVES: To determine if caregivers of children presenting to pediatric emergency departments (EDs) during the COVID-19 pandemic are delaying presenting to care for fear of contracting COVID-19. Secondary objectives were to: a) evaluate potential predictors of delay; b) describe the proportion of children whose symptoms worsened during time to presentation.

DESIGN/METHODS: A multicentre cross-sectional survey study of caregivers accompanying their children aged 0-19 years old to 16 pediatric EDs in 6 countries, from May-June 2020. An anonymous online survey, completed by caregivers via RedCAP, included caregiver and child demographics, presenting complaints, if they delayed presentation and whether symptoms worsened during this interval, as well as caregiver concerns about the child or caregiver having COVID-19 at the time of ED visit.

RESULTS: Of 1543 caregivers completing the survey, 287 (18.6%) reported a delay in seeking ED care due to concerns of contracting COVID-19 in the hospital. Of those, 124 (43.2%) stated their child's symptoms worsened during the waiting interval. Caregiver relationship to child [mother] (OR 1.85, 95% CI 1.27-2.76), presence of chronic illness in child (OR 1.78. 95% CI 1.14-2.79), younger age of caregiver (OR 0.965, 95% CI 0.943-0.986), and caregiver concerns about lost work during the pandemic (OR 1.08, 95% CI 1.04-1.12), were independently associated with a COVID-19-related delayed presentation in multivariate regression analysis.

Table 1: Characteristics of Patients and Caregivers with Delayed and Not Delayed Presentation

	Total n=1543	Not Delayed n=1256	Delayed n=287	p-value
Patient age, years (mean, SD)	7.8 (5.10)	7.8 (5.12)	7.7 (5.2)	0.597
Patient Gender Female (%)	736 (47.7%)	600 (47.8%)	136 (47.4%)	0.957
Caregiver Relationship				
Mother (%)	1,121 (72.6%)	884 (70.4%)	237 (82.6%)	**<0.001**
Father (%)	368 (23.8%)	329 (26.19)	39 (13.6%)	**<0.001**
Caregiver's age, years (SD)	39.0 (8.10)	39.5 (8.03)	37.4 (8.19)	**<0.001**
Caregiver Education:				
More than high school (%)	1,163 (75.4%)	944 (76.8%)	219 (79.1%)	0.467
Child has Chronic Illness (%)	195 (12.6%)	143 (11.5%)	52 (18.6%)	**0.002**
Chief complaint				
Trauma* (%)	631 (40.9%)	522 (41.6%)	109 (38.0%)	0.295
Gastrointestinal† (%)	193 (12.5%)	155 (12.3%)	38 (13.2%)	0.641
Non-covid infection§ (%)	199 (12.9%)	160 (12.7%)	39 (13.6%)	0.661
No COVID-19 symptoms (%)	1270 (82.3%)	1041 (82.9%)	229 (79.8%)	0.249
Child's Immunizations are Up-To-Date (%)	1379 (89.4%)	1120 (89.2%)	259 (90.2%)	0.754
History of Influenza vaccine, child (%Yes)	556 (36%)	439 (35.3%)	117 (41.1%)	0.082
Worry about missed income (%Yes)	608 (39.4%)	468 (37.7%)	140 (50.2%)	**<0.001**

SD = Standard Deviation; *Trauma = Musculoskeletal injuries, lacerations, burns, head injuries, foreign bodies; †Gastrointestinal = Abdominal pain, vomiting, diarrhea, Gastrointestinal bleed, constipation, dehydration, Inflammatory Bowel Disease flare, appendicitis; §Non-Covid Infection = ear infection, eye infection, UTI, pharyngitis

Table 2. Variables associated with COVID-related delayed presentation to the pediatric emergency department in univariate regression analysis

Potential Predictors of Delay	Odds ratio	OR 95% CI	p-value
Caregiver			
Age	0.97	(0.95 - 0.98)	**<0.001**
Relationship to child (Mother)	2.27	(1.60 - 3.30)	**<0.001**
Higher Education	0.88	(0.63 - 1.20)	0.420
Worry lost work	1.08	(1.04 - 1.12)	**<0.001**
Child			
Chronic illness	1.75	(1.23-2.46)	**0.002**
Chronic medications	1.32	(0.94 - 1.82)	0.100
Trauma presentation	0.86	(0.66 - 1.12)	0.266
Vaccines up-to-date	1.16	(0.74 - 1.87)	0.535

CONCLUSION: Almost one in five caregivers reported delaying ED presentation for their ill or injured child, specifically due to fear of contracting COVID-19 while in hospital. Mothers, younger caregivers, caregivers of children with chronic illness, and those concerned about lost work were at highest risk for delay.

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RISK FACTORS FOR STAGE III NECROTIZING ENTEROCOLITIS IN VERY LOW BIRTH WEIGHT NEONATES – A RETROSPECTIVE CASE-CONTROL STUDY

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PRIMARY SUBJECT AREA: Neonatal-Perinatal Medicine

BACKGROUND: Stage III necrotizing enterocolitis (NEC-III) is a serious intestinal inflammatory disease in neonates, with high case fatality rate and significant morbidities including need for surgical intervention. Research focusing on risk factors for the development of NEC-III are lacking.

OBJECTIVES: To determine the risk factors for NEC-III and its outcomes among neonates born under 33 weeks gestational age (GA).

DESIGN/METHODS: This was a single-centre retrospective case-control study of preterm neonates born under 33 weeks GA who were admitted to Stollery Children's Hospital neonatal intensive care unit (NICU), Edmonton, Alberta, between January 2015 and December 2018. NEC-III cases were compared with Stage II NEC (NEC-II) and matched with 2-4 non-NEC controls by GA ± 1 week and date of birth within 3 months. Univariate and multivariate analysis compared the risk factors for NEC-III, adjusting for GA, birth weight, and sex.

RESULTS: Out of 1360 babies born <33weeks, 71(5.2%) had NEC-II and above during the study period (Figure 1). NEC-III constituted 46% of the total number of NEC cases. Average age of onset of NEC-III was 13.7 days versus 23.9 days for NEC-II (p=0.01). Neonates with NEC-III were of lower GA (25.4weeks) compared to NEC-II(27.3 weeks) and non-NEC (26 weeks), (p=0.0008), had higher severity of illness with Score for Neonatal Acute Physiology Perinatal Extension-II (SNAPPE-II score) of 47.5 versus 28.4 for NEC-II and 37 for non-NEC (p=0.003), spent more days on vasoactive agents (3.7 days versus 1.1 days and 1.8 days for NEC-II and non-NEC respectively; p=0.05).

There was a trend towards lower Apgar score <7 at 10 mintues in NEC-III versus non-NEC (AOR 2.59, 95% CI [0.88-7.67]; p=0.085). Death or short bowel syndrome was higher for NEC III (AOR 12.4, 95% CI [1.16-132.28]; p=0.037).

CONCLUSION: In this case-control study of neonates born under 33 weeks GA, after adjustment for known confounders, duration of UAC and prolonged rupture of membranes were significantly associated with increased incidence of NEC-III. Composite outcome of mortality or short bowel syndrome were higher in NEC-III.

Figure 1: Patient Flow diagram