Ir Med J; September 2023; Vol 116; No. 8; P834
21st September, 2023

Neonatal Abstinence Syndrome: A National Survey

S. Tamgumus[1], C. McDermott[1], B. Cleary[1,4], N. McCallion[1,3], M. Boyle[1,3]

1. Department of Neonatology, Rotunda Hospital, Dublin 1
2. Department of Pharmacy, Rotunda Hospital, Dublin 1
3. Department of Paediatrics, Royal College of Surgeons in Ireland, Dublin 2
4. School of Pharmacy, Royal College of Surgeons in Ireland, Dublin 2

Abstract

Aim

Neonatal units have differing approaches to the management of Neonatal abstinence syndrome (NAS) and the resources allocated to this. A survey from 2009 showed this within the UK and Ireland. The aim of this project was to conduct a national survey to assess current management of NAS throughout Ireland.

Methods

The survey was conducted online via email in April 2022. A 30 question survey was developed in consultation with neonatologists, ANPs and pharmacy in Rotunda Hospital.

Results

All 21 units responded to the survey. 7/21(33%) of infants are monitored for the recommended 5 days. 21/21(100%) of units use modified Finnegan scoring however only 10/21(48%) receive training. 16/21(66%) had a non-pharmacological treatment plan. All units used oromorph as first-line agent however frequency and dosing varied significantly. 15/21(71%) use phenobarbitone as second-line. 12/21(57%) didn't have a different approach for non-opioid NAS 12/21(57%) encouraged breastfeeding and only 5/21(24%) of units had a specific parental education program for these families. 1/21(5%) had a transitional care unit.

Discussion

This national survey shows wide discrepancy in management of NAS and demonstrates the benefit that a National Guideline would have. This is a small, vulnerable population and the development of a consensus on management could standardise care and improve outcomes.

IMJ
Official Journal of the Irish Medical Organisation

Ir Med J; September 2023; Vol 116; No. 8; P834
21st September, 2023

Introduction

Neonatal abstinence syndrome (NAS) occurs following prolonged in-utero exposure to medications, such as mothers on methadone maintenance programmes but also including heroin, benzodiazepines and SSRIs among others.[1] There is increasing use of the term Neonatal Opiate Withdrawal Syndrome (NOWS) in the literature[2] however this excludes the proportion of mothers with other substance abuse issues which makes up a significant cohort of our infants.

Manifestations of NAS include CNS symptoms; irritability, hypertonicity, poor sleep, GI symptoms; weight loss, failure to gain weight, poor feeding and autonomic dysfunction; tremors, sweating.[3]

NAS is an emerging epidemic with the increasing numbers of opioid dependant mothers, particularly in the USA. A recent study in the US reported an increase in NAS admissions to neonatal intensive care units from 7 per 1000 births in 2004 to 27 per 1000 birth in 2013.[4] These infants and their treatment has a high cost and bed burden as they often require protracted lengths of stay for feeding support and pharmacological management.

There are differing approaches and at times contradictory evidence cited as to the rationale underpinning current best practice for management of NAS. As a result units frequently differ in their strategies for management and the resources that are allocated to this problem. A survey in 2009 showed that this was true within the UK and Ireland.[5] NAS management has also evolved over the course of the last 10 years with different agents such clonidine becoming more widespread.

There are currently 21 neonatal units (Level 1, 2 or 3) throughout Ireland providing neonatal care, 19 maternity centres and 2 neonatal centres within CHI that care for infants transferred from maternity centres. Our aim was to establish current practices in order to develop a national guideline to ensure best evidence based care.

Methods

A national survey was conducted to evaluate current local practices amongst the neonatal centres in Ireland . This was conducted online via Surveymonkey and distributed via email in

IMJ
Official Journal of the Irish Medical Organisation

Ir Med J; September 2023; Vol 116; No. 8; P834
21st September, 2023

April 2022. A single response was sought from each unit and the respondents included NCHD (Non Consultant Hospital Doctors), Consultants and nursing staff (ANP, CNM, CNS).

A 30 question survey was developed based on current clinical experiences, NAS management changes and recent literature in the field by the lead author. These questions were developed in consultation with neonatal consultants, ANPs and pharmacy input in the Rotunda Hospital. Ethical approval was granted via the Rotunda Hospital Research and Ethics committee (REC 2022-010). There are no conflicts of interest to declare.

Data from the questionnaires was placed in an excel spreadsheet for compilation and descriptive statistical analysis was conducted.

Results

A response was received from all 21 neonatal units, the majority of respondents were consultants (47%). Of these units 95% stated that they treated infants with NAS, however, only 76% had a written protocol for management. In 67% of units <5 infants with NAS per year are treated. Only one unit had >20 infants per year.
Overall 33% of infants are monitored for the recommended 5 days of observation with 52% being monitored <5 days.

Testing occurs in all units and toxicology testing is undertaken on urine in 100% of centres with 90% of units informing the mothers routinely prior to testing. The modified Finnegan scoring system is used in all units, however, only 48% of staff are given training in using the tool. The scoring of infants being monitored was undertaken at 4-6 hourly intervals with routine observations in 76% of centres.

A non-pharmacological treatment plan is in place in 66% of units where strategies including swaddling, reducing light and noise, minimal handling and oral sucrose are employed. One unit mentioned nursing the mother/baby dyad together. All units used oromorph as their first line agent however frequency varied from 4-6 hourly and dosing varied from 40mcg/kg to 100mcg/kg. In 66% of units their dosing of oromorph was based on the withdrawal score. The maximum dose varied between 400mcg/kg/day to 200mcg/kg/dose 4 hourly. Phenobarbitone was used as the second line agent in 71% of units with others using clonidine and clonazepam. Over half of centres (57%) did not have a different approach for non-opioid NAS and 62% didn't have a different approach for polypharmacy. Those that did advised using phenobarbitone first line or as an earlier rescue drug. The majority (80%) of units advised that they would wean 48 hourly once scores allowed for same.

IMJ Official Journal of the Irish Medical Organisation

Ir Med J; September 2023; Vol 116; No. 8; P834
21st September, 2023

Most units (90%) did not have a separate approach for preterm infants. The 2 units who did advised they were more cautious with the use of medications. The use of intracranial imaging is not common practice with 3 units (14%) routinely performing cranial ultrasounds on infants admitted with NAS. Over half (57%) of units had a policy of encouraging breastfeeding in mothers who are on methadone/opiates, interestingly 10% had a policy that discouraged breastfeeding.

In terms of multidisciplinary team input, 90% of units had pharmacy contribution, 67% had dietetic input, 71% had physiotherapy input and only 29% had SALT input, however, SALT is currently not available in most neonatal units in Ireland. In 90% of units a drug liaison midwife role did not exist in their unit. Only 24% of units had a specific parental education program for these families and 1 unit had a transitional care program available for NAS management. In 13/21 (62%) units discharge home on pharmacological treatment rarely occurred, of those 4/13 used phenobarbitone as the discharge medication. A structured follow up procedure for infants with NAS was reported in 33% of units and 52% adopted a case by case basis. The follow up procedures widely varied between units.

Summary of results are included in Table 1.0 below.

Table 1.0 Summary of Survey Results

Questions	N (%)
Written protocol	16/21 (76%)
Cases per year <5 5-10 10-20 >20	 14/21 (66.6%) 5/21 (23.8%) 1/21 (4.8%) 1/21 (4.8%)
Monitoring	
- <5 days	11/21(52%)
- 5 days	7/21 (33.3%)
- >5 days	3/21 (14.3%)
Staff training	10/21 (47.6%)
Non pharmacological plan	16/21 (76.2%)
First line - Oromorph	 21/21 (100%)

Second line	
- Phenobarbitone	15/21 (71.4%)
- Clonidine	2/21 (9.5%)
- Clonazepam	2/21 (9.5%)
- None	2/21 (9.5%)
Different approach	
- Non- opioid NAS	9/21 (42.9%)
- Polypharmacy	8/21 (38%)
- Preterm infants	0/21 (0%)
Cranial ultrasound	3/21 (14.3%)
Breastfeeding policy	
- Encourage	12/21 (57.1%)
- Discourage	2/21 (9.5%)
- No policy	7 (33.3%)
MDT input	
- Pharmacy	19/21 (90%)
- Dietetics	14/21 (67%)
- Physiotherapy	15/21 (71%)
- SALT	6/21 (29%)
Drug liaison Midwife	2/10 (9.5%)
Parental education program	5/21 (23.8%)
Transitional care program	1/21 (4.8%)
Follow up	
- Structured procedure	7/21 (33.3%)
- Case by case basis	11/21 (52.4%)

Discussion

The results of this national survey show the wide discrepancy in treatment strategies for infants with NAS. The infrequency of some units dealing with these infants compounds this (most treating less than 5 cases per year) and demonstrates the benefit that a National Guideline would have in guiding care in regional centres.

The modified Finnegan scoring system is used within all units however staff do not universally receive education regarding this (48%) which is also reflected in the variety of assessment

times that the scoring is performed at. In addition a majority of units observe at risk infants for less than the recommended 5 days as such being at risk of withdrawing in the community and being missed.

Oromorph is the first line agent used in all centres however the dosing, frequency and weaning plans all varied. The second line agent used in 71% centres is phenobarbitone, this reflects a more uniform practice compared to the previous study where only 23% used phenobarbitone as their 2nd line agent [5]. Clonidine is now used in 10% of units whereas in the previous survey in 2009 [5], there was no mention of clonidine use which has an increasing role as an adjunctive agent in the management of NAS.

Only 67% of units had a non-pharmacological treatment plan, which ought to be the first line management for symptoms of NAS and may indicate that units are quick to administer medications in these infants who may have benefited with non-pharmacological methods. This would result in a greatly increased length of stay once started on medication. This may speak to a lack of experience many units may have with infants affected with this condition.

A limitation of this survey is that there is only a single responder from each unit therefore there may be some variability in practice that is not captured. This is also a survey of practices, not an observed audit, therefore what is reported may not accurately reflect what occurs in each unit.

There is increasing evidence that there are decreased length of stays when the infant-mother dyad is kept together [6] and despite this only 1 unit had a transitional care unit. It is also concerning that breastfeeding was actively discouraged in some units when the evidence has shown it may improve outcomes and it is recommended by the AAP, ACOG and ABM [7]. In the previous survey of practices 81% of units encourage breastfeeding which shows that we have deteriorated in our support for breastfeeding in this population.

In conclusion, there is a lot of work to be done on the uniformity of management in infants with NAS throughout Ireland. This is a small, vulnerable and often under resourced patient group and the development of a consensus on management and treatment could standardise care and improve outcomes. The follow up of this group presents many challenges as once discharged home life may be chaotic and attendances at clinics may be suboptimal. Efforts at establishing robust long term follow up of this cohort may prove valuable in seeking resources for this vulnerable patient group. A national guideline and education programme would support regional centres with less experience in the area and optimise care.

Ir Med J; September 2023; Vol 116; No. 8; P834
21st September, 2023

Declarations of Conflicts of Interest:
None declared.

Corresponding author:
Sean Tamgumus,
Department of Neonatology,
Rotunda Hospital,
Dublin 1,
Ireland.
E-Mail: tamgumus@tcd.ie.

References:

1. Hudak ML, Tan RC, DRUGS TCO, FETUS TCO, NEWBORN, Frattarelli DAC, et al. Neonatal Drug Withdrawal. Pediatrics. 2012;129(2):e540-e60.
2. Sutter MB, Leeman L, Hsi A. Neonatal opioid withdrawal syndrome. Obstet Gynecol Clin North Am. 2014;41(2):317-34.
3. Jansson LM, Velez M. Neonatal abstinence syndrome. Curr Opin Pediatr. 2012;24(2):252-8.
4. Tolia VN, Patrick SW, Bennett MM, Murthy K, Sousa J, Smith PB, et al. Increasing incidence of the neonatal abstinence syndrome in U.S. neonatal ICUs. N Engl J Med. 2015;372(22):2118-26.
5. O'Grady MJ, Hopewell J, White MJ. Management of neonatal abstinence syndrome: a national survey and review of practice. Arch Dis Child Fetal Neonatal Ed. 2009;94(4):F249-52.
6. MacMillan KDL, Rendon CP, Verma K, Riblet N, Washer DB, Volpe Holmes A. Association of Rooming-in With Outcomes for Neonatal Abstinence Syndrome: A Systematic Review and Meta-analysis. JAMA Pediatr. 2018;172(4):345-51.
7. Holmes AP, Schmidlin HN, Kurzum EN. Breastfeeding Considerations for Mothers of Infants with Neonatal Abstinence Syndrome. Pharmacotherapy. 2017;37(7):861-9.