Variation in management of in-hospital newborn falls: a single-center experience

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OBJECTIVE There are only 3 small case series in the literature that report on the management of in-hospital newborn falls (NFs), and recommendations are unclear. The authors performed a retrospective review to determine outcome and differences in management and to understand why management of NFs varies at their institution.

METHODS All NFs occurring within the authors' institution over a 3.5-year period were reviewed. Post-fall management and outcomes of each incident were compared.

RESULTS There were 24 NFs out of 40,349 deliveries (5.9 NFs/10,000 deliveries). The mechanism of injury was nearly identical in 22 of 24 falls (the newborn fell to the floor from a parent in a bed or chair), and physical examination findings were normal or benign in all cases. Unexplained management variation based solely on clinician preference was noted, including observation only (in 13 cases), skull radiograph (in 7), head CT scan (in 6), bone survey (in 4), and head ultrasound examination (in 1), with some babies having more than 1 study. Two babies had nondepressed linear parietal fractures diagnosed by skull radiograph, and 2 babies had small subdural hemorrhages diagnosed by head CT scan. All 24 babies had normal findings on examination at discharge.

CONCLUSIONS There is a high incidence of nondepressed linear parietal skull fractures associated with NFs. However, since associated intracranial injury is uncommon, imaging studies may not be routinely performed. Neonatal intensive care unit admission, head CT, and neurosurgical evaluation are reserved for the rare baby with abnormal physical examination or neurological findings.

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KEY WORDS newborn; infant; fall; head trauma; skull fracture; subdural hemorrhage

IT is estimated that there are between 600 and 1600 in-hospital newborn falls (NFs) per year in the United States. This incidence estimate is based on 2 case series with a total of 23 NFs in the literature.^{8,15} Another study found a similar incidence among a much larger cohort but did not discuss management issues.²³ Post-NF management is referenced in 3 articles based on 34 NFs and varied from observation to imaging with skull radiographs or head CT; management differences did not appear to be based on mechanism of injury, physical examination findings, or other clinical information.^{8,15,20} Results of the imaging studies, when present, indicate a high risk for nondepressed linear parietal fractures without other significant injury, with normal examination findings at discharge, and without adverse long-term outcome. Recommendations in these articles vary and include observation, routine skull

radiographs, and/or head CT when concerning clinical findings exist.

Practice guidelines (from American Academy of Pediatrics [AAP]) exist for children and adolescents 2–20 years of age with head trauma,² and one paper makes recommendations regarding post-fall management in infants and toddlers aged 2 weeks to 2 years who present in the emergency department (ED),²¹ but to date there are no guidelines addressing the workup and management of newborns who fall in the hospital within the newborn period. While the 3 case series referenced above note a high rate of nondepressed parietal skull fractures associated with NF, the fact that management of these fractures was expectant and that the outcomes in these studies were benign when physical examination and neurological findings were normal raises the question of whether these new-

ABBREVIATIONS AAP = American Academy of Pediatrics; ED = emergency department; EHR = electronic health record; NF = in-hospital newborn fall; NICU = neonatal intensive care unit; SDH = subdural hemorrhage; US = ultrasound.

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borns should undergo radiographic imaging. The arguments against obtaining skull radiographs include lack of sensitivity and specificity for intracranial injury, radiation exposure, cost, and avoiding parental concern for a condition that requires no treatment. The arguments against obtaining head CT include benign findings in most cases (including the potential for small, clinically insignificant, subdural hemorrhages [SDHs] which exist at a high rate in the general newborn population), radiation exposure, cost of unnecessary imaging, and avoiding unnecessary parental concern for what is most often a clinically benign finding. On the other hand, concern about a missed epidural hemorrhage that might initially be clinically silent could prompt the clinician to obtain a head CT for every newborn who sustains an NF.

As information on management of NFs is sparse, we sought to add our data to the available literature. We predicted that post-NF management would inexplicably vary between cases, and that the outcome of these NFs would be benign.

Methods

We reviewed all NFs that occurred within the 3 Memorial Healthcare System hospitals in Hollywood, Florida, that provide obstetric services and have newborn nurseries. The maternity and newborn nursery wards at the 3 hospitals are not significantly different. Institutional review board approval was obtained. As all NFs are captured by incident reports in our Risk Management Department, and the diagnoses sections in the electronic health records (EHRs) are often incomplete, we began our search via these incident reports. All maternal and NF incident reports from January 1, 2012, through May 15, 2015, were reviewed and confirmed through the hospital's EHR system for accuracy. Imaging study reports for each incident when present were likewise reviewed. All CT studies were done with low-dose, Image Gently protocol with iterative reconstruction for further dose reduction. The information collected was limited to the data presented in Tables 1 and 2. Data points analyzed included mechanism of injury, nursing shift when NF occurred, evaluating clinician, physical examination findings, and post-NF management (including unit of observation, imaging studies, and discharge disposition).

Results

During the 40-month time period, there were 40,349 deliveries and 24 NFs at the 3 hospitals (or 5.9 NFs/10,000 deliveries). Incidence varied by hospital (2.9, 7, and 7.1/10,000 deliveries), but with such small numbers the differences are not statistically different. The details of each incident are presented in Table 1, arranged by hospital and by increasing incidence of NF. In all 24 cases, it is estimated that the newborn fell less than 1 m from either a chair (43 cm) or a bed (56 cm) to the floor (linoleum), indicating a similar mechanism of injury in each case. The exact height of the fall could not be determined for individual cases, as the newborn often fell from the parent's arms or body, an unknown height above the chair or bed, and the incident was most often unwitnessed as it occurred

while the parents were asleep in the majority of cases. In 19 (79%) of the cases the incident occurred on the night shift, between 11 PM and 7 AM, and in 16 cases (67%) a parent fell asleep while holding or feeding the newborn. The newborns were evaluated by a general pediatrician if available in the hospital ($n = 11$) or by a neonatal nurse practitioner, available in the hospital 24/7 ($n = 10$), or by both, if after examination by the pediatrician, the pediatrician asked for a neonatal consult ($n = 3$). Clinical decisions were made by the evaluating pediatrician, or by the neonatal nurse practitioner after discussion with the on-call neonatologist. Four newborns sustained a mild bump or bruise (size unknown) and the remaining 20 newborns had normal findings on physical examination. All 24 newborns had normal findings on neurological examination.

Nineteen newborns (79%) were observed in their mother's room or the newborn nursery, and the remaining 5 newborns (21%) were transferred to the neonatal intensive care unit (NICU) for observation, including 1 who was transferred from a Level 2 to a Level 3 NICU for observation of a nondepressed linear parietal skull fracture. Three of these 5 newborns were transferred to the NICU despite normal physical examination findings and without any imaging being performed before or after admission to the NICU. As shown in Table 1, there was no correlation between presence or absence of physical examination findings (bumps or bruises) and imaging (skull films and/or head CT scans), with newborns in each group receiving and not receiving imaging. There was also no correlation between positive physical examination findings and positive imaging results. Two of the 3 newborns with cranial bumps/bruises received imaging, one with skull radiographs and the other with head CT, and while both imaging studies showed cephalhematoma/soft-tissue swelling, neither showed fracture or intracranial bleed. Management variation included observation only (in 13 cases), skull radiographs (in 7), head CT (in 6), bone survey (in 4) and head ultrasound (US) (in 1), with some babies having more than 1 study (Table 2). Two babies had nondepressed parietal fractures diagnosed by skull radiograph, and 2 babies had small infratentorial SDHs (2–3 mm) diagnosed by head CT. Both babies with skull fractures subsequently had head CT scans that did not demonstrate any hemorrhage. The small SDHs did not occur in newborns with skull fractures, and birth trauma etiology could not be excluded. The findings from the remainder of the skull radiographs and head CT as well as all of the bone surveys and the head US were normal. All 24 babies had normal findings on discharge examination and discharge was not delayed in 23 of the babies. One baby was transferred to the Level 3 NICU and stayed 1 extra day for observation.

Combining our data set with the 3 studies in the literature for a total of 58 NFs yields an examination that is normal or with a mild bump/bruise in 56 babies (97%), observation only in 30 babies (52%), skull radiographs in 17 babies (29%) (demonstrating skull fractures in 7 [41%] of 17 cases), head CT in 13 babies (22%), and normal discharge examination findings and disposition in all 58 babies (100%) (including 1 baby reported in the literature who had transient encephalopathy after a fall from 1.2 m). Since radiographs were not obtained in all cases, the true

TABLE 1. Circumstances and evaluation of the 24 in-hospital NFs

Hospital	Case No.	Shift	Circumstances of Fall	Physical Exam	Diagnostic Workup	Outcome
A						
	1	N	Mother getting out of bed holding baby; baby slipped out of hands to floor	Arm & back red	Radiographs of arm & clavicle, CT of head	Radiographs & CT neg
	2	N	Mother burping baby; baby fell out of hands to floor	Normal	Skull radiographs, head US	Radiographs & US neg
	3	N	Mother fell asleep holding baby; baby fell to floor	Normal	None	
B						
	4	N	Mother fell asleep in bed breast-feeding baby; baby fell to floor	Normal	CBC, observation	CBC normal
	5	E	Father fell asleep holding baby; baby fell to floor	Normal	None	
	6	N	Mother fell asleep in bed breast-feeding baby; baby fell to floor	Normal	Skull radiographs, radiol recommended head CT (not done)	Parietal soft-tissue swelling on radiographs
	7	D	Mother walking w/ baby, felt dizzy, kneeled to floor; baby rolled off knees to floor	Normal	None	
	8	N	Mother fell asleep holding baby; baby fell to floor	Normal	None	
	9	N	Mother fell asleep in bed breast-feeding baby; baby fell to floor	Normal	None	
	10	N	Mother fell asleep holding baby; baby fell to floor	Normal	To NICU for observation	
	11	N	Mother fell asleep breastfeeding baby; baby fell to floor	Normal	Observation	
	12	E	Mother fell asleep holding baby; baby fell to floor	Normal	Skull radiographs, then to NICU for head CT, NS eval	Parietal skull Fx on radiographs, skull Fx & soft-tissue swelling on CT
	13	N	Mother fell asleep holding baby; baby fell to floor	Normal	To NICU for observation, bone survey, head CT, NS eval	Bone survey neg, small SDH on CT
	14	N	Mother fell asleep holding baby; baby fell to floor	Normal	To NICU for observation, skull radiographs	Radiographs neg
C						
	15	N	Father fell asleep holding baby; baby fell to floor	Normal	Bone survey	Bone survey neg
	16	N	Mother fell asleep in reclining chair holding baby; baby fell to floor	Normal	None	
	17	N	Mother trying to put baby in crib; baby fell to floor	Normal	None	
	18	N	Mother fell asleep holding baby; baby fell to floor	Normal	None	
	19	E	Mother breastfeeding baby on folded pillow; baby slipped off pillow & fell to floor	Bump on head	Observation (NP recommended head CT, parents refused)	
	20	D	Mother burping baby in chair; baby fell out of mother's hands	Normal	Skull radiographs, then transfer to Level 3 NICU for head CT, NS eval	Nondepressed parietal Fx on radiographs, nondisplaced parietal Fx & parietal hematoma on CT
	21	N	Mother fell asleep holding baby; baby fell to floor	Parietal swelling	Observation, skull radiographs, bone survey	Parietal cephalhematoma on radiographs, bone survey neg
	22	N	Grandmother burping baby; baby fell to floor	Normal	None	
	23	N	Father holding baby; baby slipped to floor	Small bruise on forehead	Skull radiographs, head CT	Radiographs neg, minimal soft-tissue swelling on CT

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TABLE 1. Circumstances and evaluation of the 24 in-hospital NFs

Hospital	Case		Circumstances of Fall	Physical Exam	Diagnostic Workup	Outcome
	No.	Shift				
C						
	24	N	Mother fell asleep holding baby; baby fell to floor	Normal	Head CT	2- to 3-mm PF density on CT suspicious for small SDH (from fall or delivery?); radiol recommended repeat head CT in 8–12 hrs, not done

CBC = complete blood count; D = day (7 AM–2:59 PM); E = evening (3 PM–10:59 PM); eval = evaluation; Fx = fracture; N = night (11 PM–6:59 AM); neg = negative; NP = nurse practitioner; NS = neurosurgery; PF = posterior fossa; radiol = radiologist; US = ultrasound.

incidence of skull fractures in the population of babies who have fallen during the newborn period is unknown.

Discussion

Our data indicate that the incidence of NFs varies by institution, and that published data may underestimate the scope of this problem. We found that NFs occurred on average 5.9 times in 10,000 hospital births in our institution, which translates to approximately 2500 NFs in the United States annually, higher than the 600–1600 estimated previously.^{8,15} The incidence varied by hospital within our institution though, and so with such small numbers at our institution and in the literature, and without more national hospital data, it is hard to predict the true incidence of NFs. The largest study to date from the Pennsylvania Patient Safety Authority reports 262 NFs among 1,254,730 live births (or 2.1 NFs per 10,000 births).²³

Physical examination findings in our cohort were mostly normal, with the exception of a few with mild bruises or hematomas. The 3 NF case series in the literature similarly report normal examination findings in most newborns, except for a few with bruises or hematomas, and 2 with more significant findings (1 with depressed skull fracture and 1 with transient encephalopathy who fell from a height greater than 1 m).^{8,15,20} The low incidence of significant examination findings is likely related to the mechanism of injury where newborns fell from less than 1 meter onto a linoleum floor.

Despite similar mechanisms of injury, practice variation regarding site of observation (newborn nursery vs NICU) as well as method of evaluation (observation vs various imaging modalities) differed among newborns both in our data set and in all 3 NF studies in the literature. This is not surprising, as there are no published guidelines recommending appropriate evaluation and management of closed head injuries in newborns who fall in the hospital during the first few days of life. The AAP and American Academy of Family Physicians (AAFP) published guidelines for the management of isolated minor closed head injuries in children and adolescents 2–20 years of age who present with normal physical and neurological examination findings, and because the risk of intracranial injury is negligible with these minor injuries, they recommend a thorough physical and neurological examination as well as observation but do not recommend any radiography, CT, or MRI.² Observation should extend at least 24 hours but

can occur in the hospital or at home. They note that skull films have poor sensitivity (intracranial lesions are not always associated with skull fractures) and poor specificity (skull fractures do not always indicate underlying intracranial lesions) for significant intracranial injury, and although CT and MRI can detect intracranial abnormalities, there is no evidence that neuroimaging in asymptomatic children improves outcomes. A recent study by Powell et al. reported that of 350 children (median age 10 months) seen in the ED with blunt head trauma (mostly falls) who had imaging studies consistent with an isolated linear skull fracture, none required neurosurgical intervention, and none of those who had follow-up imaging after discharge had any new findings.¹⁷

While there is no official statement from any organization regarding minor closed head injuries in children under the age of 2 years, Schutzman et al. propose guidelines for children and infants 2 weeks to 2 years of age.²¹

TABLE 2. Physical examination findings, evaluation, and outcomes of the 24 NFs in the Memorial Hospital System

Variable	No. of Cases (%)
Physical exam	
Normal	21 (88)
Bruise/swelling	3 (12)
Significant	0
Imaging*	
None	13 (54)†
Skull radiographs	7 (29)‡
Bone survey	4 (17)
Head US	1 (4)
Head CT	6 (25)§
Outcome	
Normal	24 (100)
Abnormal	0
Total	24 (100)

* Some newborns underwent more than 1 imaging study.

† Admission to NICU in 3 cases.

‡ Nondepressed skull fracture in 2 cases; both newborns were admitted to the NICU.

§ Small SDH in 2 cases. Three of the newborns who had CT scans were admitted to the NICU. Of the 2 newborns who had SDH on CT, 1 was admitted to the NICU and 1 was not.

This age group is considered separately from older children as they are more difficult to assess, skull fractures are more prevalent, and occult intracranial injury occurs more commonly. According to the authors' algorithm, most NFs would either fall into the "intermediate risk" category (defined as presence of a hematoma, fall onto a hard surface [e.g., linoleum], or an unwitnessed trauma), and their recommendations in this scenario are observation only versus CT or skull radiographs, or the "low risk" category (defined as low-energy mechanism [fall from < 3 feet], with no signs or symptoms), and their recommendation in this scenario is observation only. They also note that despite a high incidence of skull fractures, with skull fracture being a risk factor for intracranial hemorrhage, the incidence of late deterioration with a skull fracture is zero. They recommend observation for 4–6 hours postinjury to assess for development of symptoms. Hughes et al. also found that children who present to the hospital have a greater likelihood of skull fracture or intracranial injury if they are under 12 months of age, fell from a height greater than approximately 2 feet, fell on their parietal/temporal or occipital area, fell from a caregiver's arms, or fell onto a wooden floor.¹⁰

One unique consideration in the newborn and infant population is the higher risk associated with exposure to radiation than in older children and adults.^{4,9} It is estimated that the lifetime risk of death due to a cancer caused by exposure to 1 head CT scan in a child ranges from 1 in 1000 to 1 in 5000,^{3,4,16} leading to the recommendation that CT should only be used when necessary and under specific guidelines when available. One such guideline, the Pediatric Emergency Care Applied Research Network (PECARN) identifies children at low risk of traumatic brain injury and who should therefore forego neuroimaging.¹² Applied to children under the age of 2 years, this would include those with normal mental status and behavior, no severe mechanism of injury, absence of nonfrontal scalp hematoma, and no evidence of skull fracture. However, due to the limitations of clinical assessment in infants, concern has been raised that even asymptomatic infants under 3 months of age who have sustained head trauma through a minor mechanism of injury may have skull fractures and more severe intracranial pathology.^{5–7,18,20} Indeed, a sizeable percentage of the babies in our data set and in the NF literature did have skull fractures. A lower threshold for imaging has therefore been suggested in asymptomatic infants, especially those with scalp hematomas^{6,22} or in the first months of life.^{5,13,18} Some have advocated that all asymptomatic infants under 2–3 months of age who sustain even minor head trauma undergo head imaging to detect clinically silent intracranial injury, especially in the presence of a scalp hematoma.^{6,13,18} The majority of treating clinicians in the 3 studies of NF in the literature and those at our own institution do not believe this applies to NF, as only 13 (22%) of 58 newborns sustaining NF received a head CT scan.

The presence of a cephalhematoma or scalp swelling in the setting of NF does not appear to correlate with intracranial pathology, nor does it predict which newborns receive cranial imaging. In our experience, almost all sig-

nificant intracranial injuries (e.g., an epidural hematoma that causes significant compression) will cause serious clinical findings (e.g., ill appearance, lethargy, poor feeding), and will be found after a period of observation. Also, newborns have an open fontanel and sutures, which allow expansion and time to recognize and treat significant epidural hemorrhages. What differentiates the newborn who sustains an NF from other infants and children brought to the ED for head injuries is the known mechanism of injury (fall from a sleeping parent close to the floor), the lack of concern for child abuse, and the ability to continue to closely monitor the newborn in the hospital. In addition, we now have a cohort of 58 babies who sustained NFs, none of whom required neurosurgical intervention or who sustained any known long-term neurological injury. Extrapolating from the infant and toddler literature then, alternative management strategies for NF might include close observation from anywhere from 3 to 24 hours for signs of clinical deterioration.^{8,12,21} This has been shown to reduce the exposure to CT radiation without missing clinically significant intracranial injury, even in cases deemed intermediate risk due to the infant or child being less than 2 years of age.¹² MRI, and specifically rapid MRI, would obviate the need to subject these newborns to CT radiation. However, within our hospital system, rapid MRI is not readily available at night when most of these falls are occurring, and it may not be available at all at other institutions, especially community hospitals. While we did not study the use of MRI for this diagnosis, this might be an area of future research.

We found that of 6 newborns who had a head CT performed as part of the evaluation for NF, 2 had findings of SDH (both infratentorial and 2–3 mm). This rate of 33% seems high, but 3 articles that assess the incidence of SDH in asymptomatic full-term newborns who did not sustain NF found similar rates of 8%, 19%, and 46%.^{14,19,24} The study with the strongest methodology, by Rooks et al., found an SDH rate of 46% based on MRI performed within 72 hours of birth and using a relatively strong magnet of 1.5 T.¹⁹ Also, the facts that these small SDHs did not occur in the newborns with skull fractures and that they occurred in the infratentorial region of the brain suggest that they may be due to birth trauma rather than the fall. Alternatively, the small size and infratentorial location of these SDHs is known to be the common pattern of newborn intracranial hemorrhage noted incidentally on MRI in asymptomatic neonates with no history of birth trauma.¹⁴

There are no guidelines published for NF in babies less than 2 weeks of age. The 3 case series of NF in the literature vary in their conclusions. Ruddick et al. acknowledge a high incidence of skull fractures but make no recommendations regarding post-fall evaluation.²⁰ Monson et al. also note a high incidence of skull fractures and therefore recommend skull radiographs and 24 hours of in-hospital monitoring; however, they do not explain how knowledge of the presence of a skull fracture will lead to better management and/or outcome.¹⁵ Helsley et al. recommend 12 hours of observation with neurological checks, and a head CT only if symptoms are present or develop.⁸ There are rare case reports of newborns who sustain more serious injuries after a fall. Some of these infants have immediate

TABLE 3. Post-NF script to parents for neonatologists/nurse practitioners/pediatricians at the Memorial Hospital System

1. Reassuringly, almost all newborns who fall in the hospital sustain no long-term injury.
2. The most important sign of a serious injury is an abnormal exam, which your baby does not have.
3. While an x-ray might show a fracture, skull fractures around the time of birth are usually not associated with significant internal injuries, and there is no treatment needed for simple linear skull fractures, so we do not do skull x-rays on babies who fall if their exams are normal.
4. While a head CT might show a small amount of internal bleeding, 50% of newborns in the hospital have a small amount of internal bleeding due to the birth process. Because of the risk of exposure to radiation of a head CT and the benign nature of this small amount of internal bleeding that half of all newborns have anyway, we do not do head CTs on babies who fall in the hospital if their exams are normal.
5. We, you, and your pediatrician will continue to monitor your baby closely for the next 12–24 hours to make sure his/her exam remains normal. Arrange a follow-up appointment with your pediatrician for tomorrow. If concerning symptoms (i.e., lethargy, inconsolable crying, vomiting) arise in the hospital or after discharge, alert your pediatrician immediately or bring your baby directly to the ER.

signs and symptoms of more serious injury, such as the 2 infants in the literature described above with depressed skull fracture and transient encephalopathy. Josephsen et al. report on a newborn with normal findings on initial examination but subsequent clinical deterioration 5 hours post-NF with development of an acute epidural hematoma requiring emergency neurosurgery.¹¹ They recommend close monitoring for 12–24 hours after NF. Some might argue that given this potential, CT or MRI should be performed after all NFs in order to detect rare but significant intracranial pathology and to protect against medicolegal liability. However, CT scans were ordered in less than one-quarter of cases of NF in our study and in the literature. We feel that in cases of NF with normal physical examination findings other than small bumps and bruises and with normal findings on neurological examination through at least 12 hours after the fall, a policy of universal head CT scans is not warranted in light of the burdens and costs of imaging including radiation exposure and parental anxiety. We say this knowing that our study was underpowered to detect rare events and that the risk of a serious epidural hemorrhage is unlikely but not completely known. Further case series from other institutions and continued monitoring at our own institution may help answer this question. We conclude that despite a high prevalence of skull fractures and small SDHs (unknown if related to the fall or to delivery events), the asymptomatic newborn who sustains an NF has a very low risk of developing neurological sequelae from the fall. A thorough physical and neurological examination should be performed after any NF. A period of observation of 12–24 hours, as recommended in the aforementioned studies, while lacking in evidence, seems prudent to observe for development of signs or symptoms of intracranial injury. Admission to the NICU, head CT, and neurosurgical evaluation would be reserved for those newborns with clinical signs (depressed, basilar, or widely diastatic skull fracture) or symptoms (loss of consciousness, abnormal behavior, or vomiting) consistent with intracranial injury. We have created a script that we relate to parents after their newborn falls in the hospital (Table 3).

There are a number of limitations to this study. The number of babies who sustain NF is low both in our hospital and in reports in the literature. It is difficult to draw conclusions based on these small numbers, and we encourage more institutions to report their experience with NFs. In the spirit of the “Choosing Wisely” campaign,¹ we also encourage national organizations such as the AAP to sug-

gest guidelines that would encourage clinicians to evaluate NFs in a safe yet practical manner. NFs are often unwitting (as they were in the majority of our cases) and this means the height of the fall and mechanism of injury are not always apparent. However, given that the infant usually falls from a caregiver asleep in a bed or chair, our estimate of the fall being less than 1 meter seems justified. As this was a retrospective review, much information about the fall was unknown (i.e., exact height of the fall, size of the bump or bruise when one was documented, rationale of the clinician for chosen evaluation, and whether parental response or anxiety played a role in image ordering). Also given that some of the imaging studies showed soft-tissue swelling despite absence of reported abnormal physical examination findings in some cases, it is possible that undocumented physical examination findings prompted some clinicians to order imaging studies. Given that the incident reports and EHRs were carefully reviewed, however, it is more likely that the imaging findings were not detected clinically. While no baby who sustained an NF in our institution appears to have developed any postdischarge sequelae as reported in the medical record, it is possible that the parents or caregivers sought care outside our institution.

Conclusions

The evidence from our institution, as well as that reported in the literature, suggests that it is uncommon for newborns who fall in maternity wards from a low height to sustain serious injury. Imaging has not been shown to change the management of NFs in our cohort or in the literature, and we therefore limit radiographic imaging to those newborns whose physical or neurological examinations are abnormal. We recognize that, while rare, serious intracranial injury can occur and therefore recommend a period of observation for all NFs. Further studies in the literature and statements from pediatric organizations will help support these findings and recommendations.

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Disclosures

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Author Contributions

Conception and design: all authors. Acquisition of data: Kahn, Fisher. Analysis and interpretation of data: all authors. Drafting the article: all authors. Critically revising the article: all authors. Reviewed submitted version of manuscript: all authors. Approved the final version of the manuscript on behalf of all authors: Kahn. Statistical analysis: Kahn. Administrative/technical/material support: Kahn. Study supervision: Kahn.

Supplemental Information

Previous Presentations

Portions of this work were presented in poster format at the Southeastern Association of Neonatologists Annual Meeting in Naples, Florida, May 20–21, 2016.

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