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Diagnostic coding of abuse related fractures at two children's emergency departments

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ABSTRACT

Objectives: Pediatric fractures suspicious for abuse are often evaluated in emergency departments (ED), although corresponding diagnostic coding for possible abuse may be lacking. Thus, the primary objective of this study was to determine the proportion of fracture cases investigated in the ED for abuse that had corresponding International Classification of Diseases (ICD) codes documenting abuse suspicion. Additional objectives were to determine the proportion of these fractures with admission ICD abuse coding, and physician text diagnoses recording abuse suspicion in the ED and/or admission notes. Factors possibly associated with abuse-related ED ICD codes were also examined.

Methods: Children less than three years of age that presented primarily with a fracture to two large academic children's hospitals from 1997 to 2007 and were evaluated for suspicion of abuse by child protective services were included in this retrospective review. The main outcome measure was the proportion of the fracture cases that had abuse suspicion reflected in ED discharge ICD codes.

Results: Of the 216 eligible patients, only 23 (11.5%) patients had ED ICD codes that included the possibility of abuse. Forty-nine (22.7%) had the possibility for abuse documented by physicians as an ED discharge diagnosis. In addition, 53/149 (35.6%) of all admitted patients and 34/55 (61.8%) of confirmed abuse cases included abuse-related admission ICD coding. Female gender was found to be a factor associated with ED ICD abuse codes.

Conclusion: Current standards of ICD coding result in a significant underestimate of the prevalence of children assessed in the ED and hospital wards for possible and confirmed abusive fracture(s).

Introduction

Physical abuse plays a significant role in childhood morbidity and mortality (Scott, Tonmyr, Fraser, Walker, & McKenzie, 2009), and is responsible for 15–30% of fractures occurring in children under 3 years of age (Kowal-Vern et al., 1992; Leventhal, Thomas, Rosenfield, & Markowitz, 1993; Oral, Blum, & Johnson, 2003; Skellern, Wood, Murphy, & Crawford, 2000). These abusive fractures may be identified and appropriately evaluated in emergency departments (ED), but physicians may not be adequately documenting the underlying suspicion of abuse (Boyce, Melhorn, & Vargo, 1996; Christopher, Anderson,

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Gaertner, Roberts, & Wasser, 1995; Limbos & Berkowitz, 1998; Oral et al., 2003; Taitz, Moran, & O'Meara, 2004; Ziegler, Sammut, & Piper, 2005). However, recording the potential for abuse is important since coding of any health condition or diagnosis relies on the comprehensiveness of the clinical details written in the medical record (Scott et al., 2009; Yao, Wiggs, Gregor, Sigurnjak, & Dodek, 1999). This information is translated into the alpha-numeric codes from the International Statistical Classification of Diseases and Related Health Problems (ICD) system (Scott et al., 2009), and ICD codes serve as a tool for reporting the prevalence of abuse (Agran, Winn, Anderson, Trent, & Walton-Haynes, 2001; Agran et al., 2003; Rovi & Johnson, 1999). These data may then be used in health services research, for information sharing between departments, and for determining costs and support systems required for the investigation of this concerning and resources intensive problem (Rovi & Johnson, 1999; Winn, Agran, & Anderson, 1995; Yao et al., 1999).

Prior research has questioned the accuracy of using ICD codes to determine the frequency of child abuse related injuries (Barlow, Milne, Aitken, & Minns, 1998; Crume, DiGuiseppi, Byers, Sirotnak, & Garrett, 2002; Ewigman, Kivlahan, & Land, 1993; Herman-Giddens et al., 1999; Leventhal, Martin, & Asnes, 2010; Rovi & Johnson, 1999; Scott et al., 2009; Winn et al., 1995). Some of these studies have shown that maltreatment has been under-represented as the etiology for injuries (Barlow et al., 1998; Rovi & Johnson, 1999; Winn et al., 1995). However, it is unknown to what extent this is true for children presenting to the ED specifically with fractures suspicious for abuse.

The primary objective of this study was to determine the proportion of fracture cases investigated in the ED for abuse that had corresponding ICD codes documenting abuse suspicion. Additional objectives were to determine the proportion of these fractures with admission ICD abuse coding, and physician text diagnoses recording abuse suspicion in the ED and/or admission notes. Factors possibly associated with abuse-related ED ICD codes were also examined.

Methods

Patient population

Children less than 3 years old (Hobbs, 1989; Kemp et al., 2006; Taitz et al., 2004) who presented primarily with a fracture to The Hospital for Sick Children (SickKids) or the Children's Hospital of Eastern Ontario (CHEO) ED from 1997 to 2007 and were evaluated for abuse by the hospital's respective child protective team (CPT) were included in this study. The ED is where the vast majority of fractures are evaluated and therefore coding errors at this level would have a big impact on this population. It is routine practice for staff pediatric emergency physicians at both sites to document the final ED discharge diagnosis. All cases diagnosed with abusive fractures in the ED, ward, or as an outpatient were evaluated by the hospital's respective CPT. SickKids and CHEO CPT are the only child abuse specialists in their respective greater Toronto and Ottawa areas, and therefore are involved in the assessment of most cases of suspected abuse in these regions of Ontario. Assessment by these hospital-based CPT results in classification of the fracture as abusive, accidental or indeterminate. The classification of "abusive" for admitted cases was often finalized prior to hospital discharge. Cases were excluded if the child's clinical presentation was predominantly consistent with some other type of trauma (e.g., head injury), medical records were inaccessible, the child was admitted/referred directly to hospital ward/ICU or subspecialty service without an evaluation by the ED physician, and/or the child was not evaluated in the ED for suspicion of abuse. In addition, if the fracture was definitively determined to be accidental by CPT prior to ED discharge one would not expect that a physician would include suspicion of abuse in the final diagnoses, and as such, these cases were not included in this review. If a case was not confirmed as accidental at the level of the ED, but the diagnosis of accidental injury was established during a hospitalization, ED diagnosis/coding of abuse of these cases were included, but final admission diagnosis/coding of abuse of these cases were not included in our admitted patient data. Permission for this research was granted by both institutional research ethics boards.

Definitions

Children with fractures were considered "evaluated in the ED for the suspicion of abuse" if the child was evaluated by the hospital-based CPT and had at least one of the following events: (1) consultation with the Children's Aid Society (the provincial child welfare association); (2) a skeletal survey was performed; (3) the child was admitted to the hospital for an evaluation by the hospital's CPT; (4) suspicion of abuse was documented anywhere on the ED chart (i.e., ED notes, discharge diagnosis, and/or child protection team consults); (5) the child was referred to SickKids or CHEO ED from an outside hospital/physician for evaluation of abuse; (6) ED subspecialty consultation documented suspicion for abuse. Children considered suspicious for abuse by the ED were also considered as such by the institutional CPT.

Fractures were determined to be "abusive" by the CPT if at least one of the following criteria was met (Jenny, Hymel, Ritzen, Reinert, & Hay, 1999; Leventhal et al., 1993; Ravichandran et al., 2009; Taitz et al., 2004): (1) confession of intentional injury by an adult caretaker, (2) inconsistent/inadequate history provided, (3) inappropriate delay in seeking medical care, (4) associated inadequately explained injuries, (5) in the absence of bone disease, presence of fractures uncommon for accidental injury and frequently reported in abusive injury (e.g., metaphyseal limb fractures, posterior rib fractures not due to birth trauma) (Kleinman, 1998; Kleinman, Marks, Richmond, & Blackbourne, 1995; Leventhal et al., 1993) and (6) witness to abuse came forward.