

Paediatric Cases Referred to the Office of the State Pathologist

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Abstract

Aim

The forensic pathology services of the Office of the State Pathologist (OSP) are occasionally requested following the sudden death of a child. This review aims to determine the relevance of forensic pathologists in child death investigations in Ireland, adherence by the OSP to paediatric autopsy guidelines and to analyse the causes of these children's deaths.

Methods

A retrospective review of all paediatric cases referred to the OSP from 2012-2017 was conducted. Relevant information was recorded using Microsoft Excel©.

Results

There were 79 cases included in this review. 61 cases (77%) were referred as suspicious deaths while 18 cases (23%) were referred without documented reason. Paediatric pathologists (PP) were involved in 22 cases (28%). The commonest cause of death in children under the age of three was natural disease (79%). Most of the paediatric autopsy standards were reached by the OSP but there were some shortcomings identified, particularly in cases not involving a PP.

Conclusion

Based on the findings that autopsy guidelines are better adhered to when a PP performs the autopsy, coupled with the higher incidence of natural causes of death in children aged under three, all paediatric deaths, unless a forensic element is apparent, should be referred to a PP in the first instance.

Introduction

The Office of the State Pathologist (OSP) is the only facility in Ireland that employs full-time forensic pathologists to provide a nationwide forensic pathology service. The main role of the OSP is to conduct autopsies to aid in the medico-legal death investigation of cases of forensic significance.

Paediatric pathology is a branch of pathology that specialises in the pathophysiology of disease specific to children. In addition to histological examination, paediatric pathologists also conduct autopsies. Causes of death in the paediatric population are extremely varied, with some unique to children, e.g. Sudden Infant Death Syndrome (SIDS). Natural causes of death in paediatric populations also differ greatly from those of adult populations and require specialist input from a paediatric pathologist.^{1,2}

On occasion, paediatric deaths may require the input of a forensic pathologist. These can range from unusual or suspicious injuries noted on the child's body in hospital or at autopsy, to issues such as possible neglect or abuse. The forensic pathologist can help determine the forensic significance of such injuries and determine whether they contributed to death.

We conducted a review of all paediatric cases referred to the OSP from 2012-2017, focussing on three specific points: the relevance of input from a forensic pathologist, the causes of death in different age demographics and the degree of adherence by the OSP to best practice infant autopsy guidelines.

Methods

All paediatric cases (cases involving persons aged under 18) referred to the OSP between 2012-2017 were included in this review. Data was extracted from hard copy files stored at the OSP. The extracted data was analysed and recorded using a Microsoft Excel® spreadsheet on a secure computer within the OSP. The cases were anonymised and recorded by number. Each component of the spreadsheet was scrutinised in accordance with the aims of the review.

The standards selected included The Royal College of Pathologists' autopsy guidelines for neonatal deaths and third trimester antepartum and intrapartum stillbirth, the Coroner's Rules Report, the National SIDS Autopsy Protocol and the Health Service Executive's 'Standards and Recommended Practices for Post-Mortem Examination Services'^{3,4,5,6}.

Results

There were 79 paediatric cases referred to the OSP between 2012-2017, representing 7.6% of the total number of cases dealt with by the OSP in these years (n=1039). 52 cases involved boys and 27 cases involved girls. Thirty cases occurred in the Dublin district coronial region and the remainder occurred in other coronial regions. The cases were categorised into three age ranges; <1, 1-12 and 13-17.

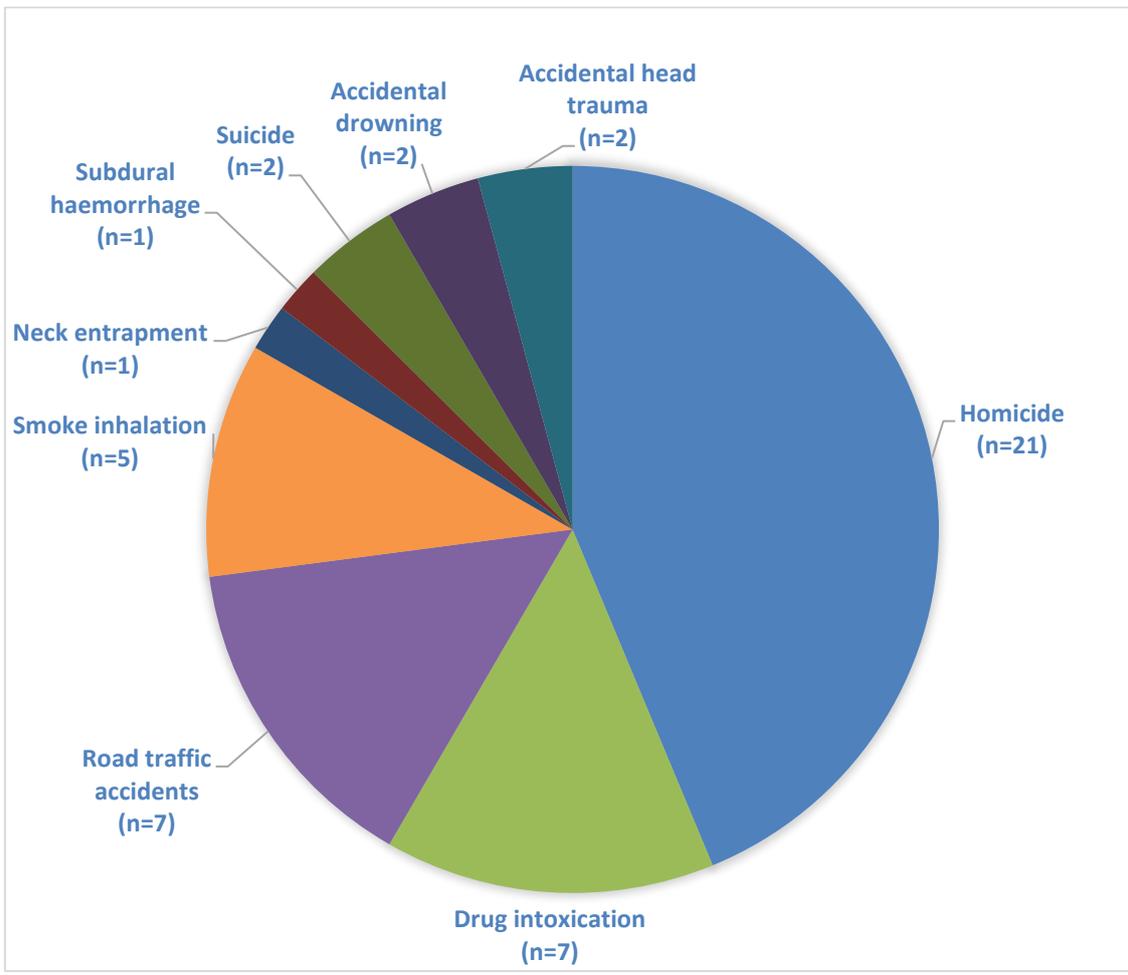


Figure 1: Unnatural causes of death

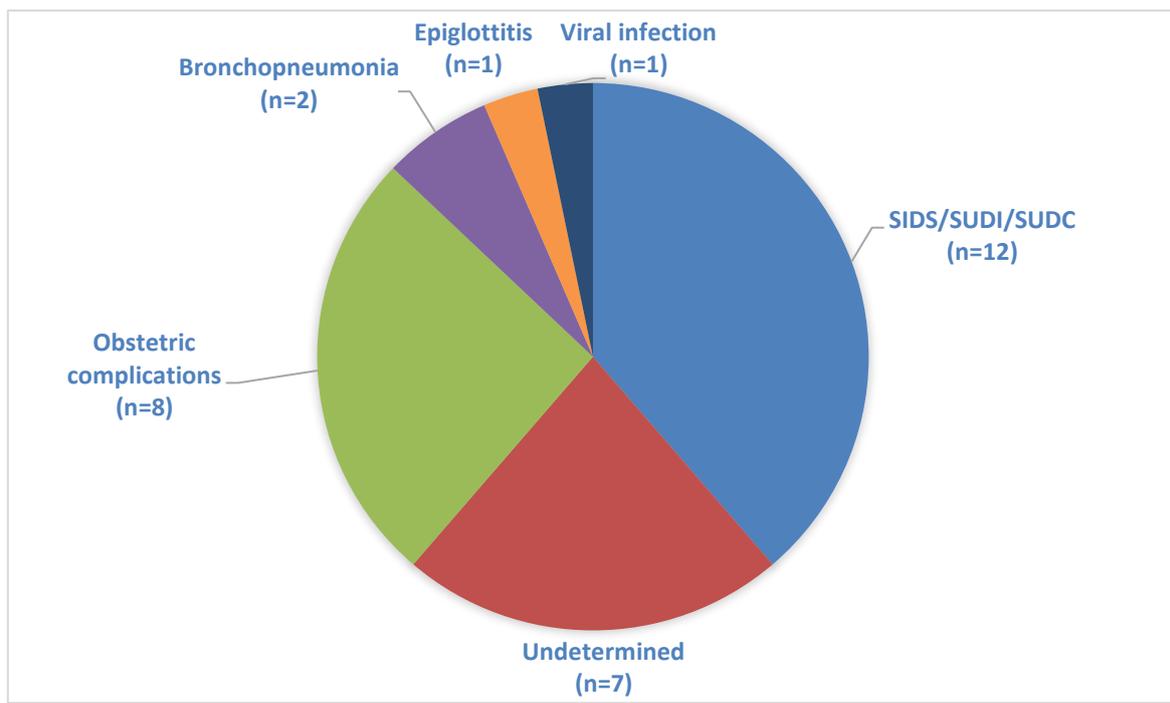


Figure 2: Natural causes of death

Figures 1 and 2 outline the prevalence of all causes of death encountered in paediatric cases referred to the OSP from 2012-2017. Figure 1 details all unnatural causes of death contained in this review (n=48) while Figure 2 describes all-natural causes of death (n=31).

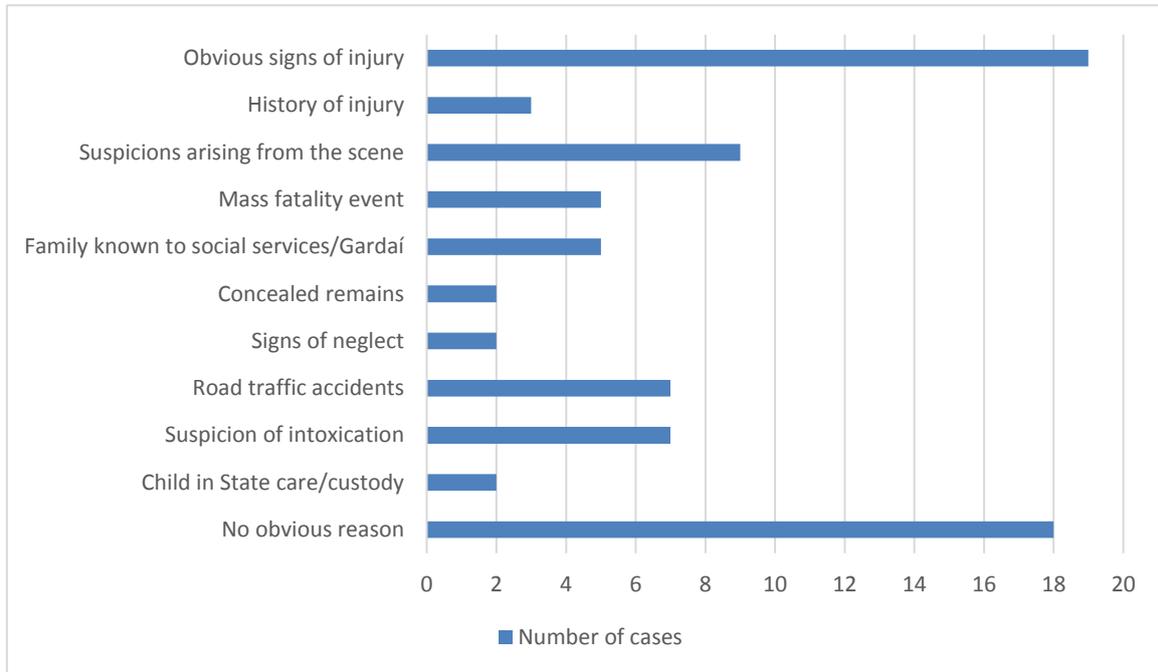


Figure 3: Circumstances of referral of paediatric deaths to the OSP from 2012-2017

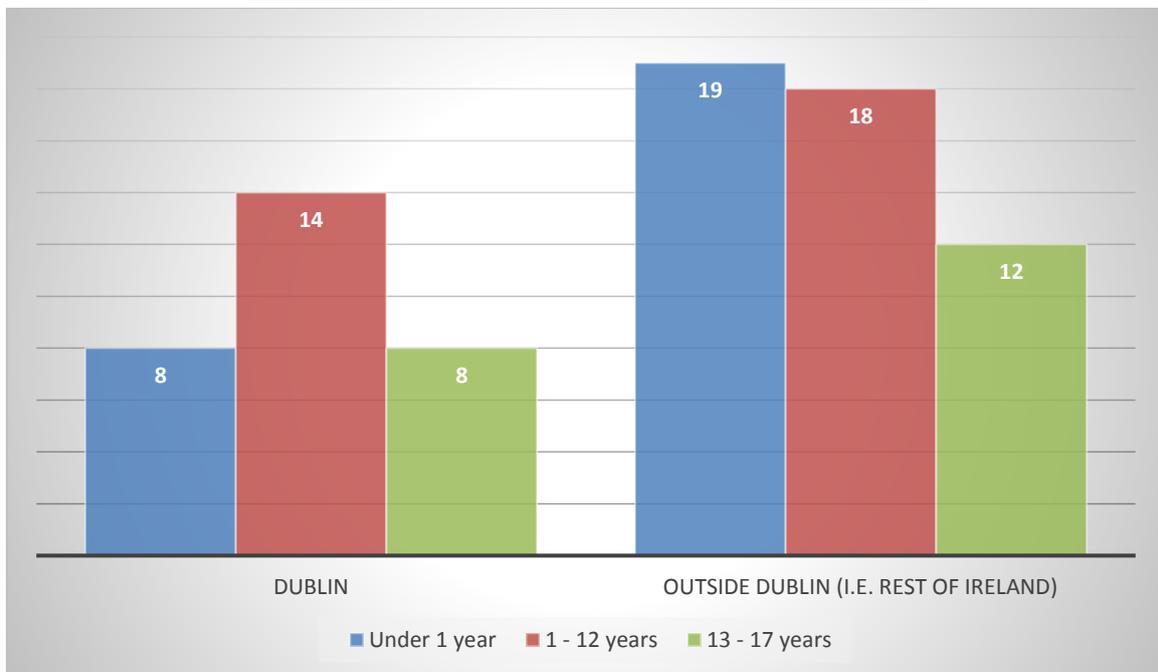


Figure 4: Locations of OSP paediatric cases from 2012-2017 with respect to age of child

Relevance of Forensic Pathologist

Retrospectively, 61 of the 79 cases required input from a forensic pathologist, due to suspicious circumstances surrounding the deaths. In 45 of the 61 cases, the cause of death was unnatural, including 21 homicides, 2 suicides and 22 accidental deaths. The causes of death in the remaining 16 cases were determined as natural disease. However, input from the OSP was justified owing to suspicions surrounding these deaths. Figure 3 provides a breakdown of the reasons for referral in all of these cases.

As shown in Figure 3, there were 18 cases where the reason for referral to the OSP was unclear; there were no worrying external injuries and no obvious suspicious circumstances. Further examination of the case files failed to provide a reason for referral. The majority (n=14) of these cases involved children under the age of two, whose deaths were attributable to Sudden Infant Death Syndrome/Sudden Unexpected Death in Infancy or Childhood (SIDS/SUDI/SUDC) (n=6), traumatic and precipitate births (n=5), epiglottitis (n=1), viral infection (n=1) and bronchopneumonia (n=1). Of these 18 cases, 12 were referred to the OSP by coroners outside Dublin.

Cause of death: Under 1-year-old

There were 27 autopsies carried out by the OSP on children under 1-year-old, including 12 perinatal deaths (deaths occurring at greater than 24 weeks' gestation or less than 7 days of life ex-utero). The most common causes of death in children under 1-year-old were SIDS/SUDI (n=9), undetermined (n=6), traumatic birth/precipitate delivery (n=3), and homicide (n=3). Other causes of death included intrauterine deaths (n=4), prematurity (n=1) and smoke inhalation (n=1). 8 of these cases were referred by the Dublin Coroner, while 19 were referred by coroners from outside Dublin. This is shown in Figure 4, which also details the locations of cases involving older age ranges.

A paediatric pathologist (PP) conducted the autopsy examination with a forensic pathologist (FP) in 13 of the 27 deaths involving children under the age of one. A PP gave their opinion regarding histology taken by a FP at autopsy in two further cases. In 14 of the 15 cases involving a PP, the cause of death was natural. In all of these 15 cases, there were no significant injuries reported by the Gardaí or attending doctor at the scene prior to the autopsy. However, in two of the cases, significant injuries were found at autopsy and on radiological imaging.

In the 12 cases performed by a FP without involvement of a PP, there was no evidence of significant trauma in 10. In the remaining two cases, the cause of death was evidently unnatural from the outset. In three of these 12 cases, two FP performed the autopsy examination together.

Cause of death: 1-12 years' old

There were 32 forensic paediatric cases involving children between the ages of 1-12 inclusive. The most common causes of death in this age group were homicide (n=14), smoke inhalation (n=4) and SUDC (n=3).

Other causes of death included: accidental head trauma (n=2), bronchopneumonia (n=2), drug intoxication (n=2) and one case of each of the following: acute-on-chronic subdural haemorrhage, road traffic collision (due to injuries sustained following unintentional road traffic collisions), epiglottitis, viral infection and accidental drowning.

In six of the 32 cases in this age group, a PP performed the autopsies in the presence of a FP and in one additional case a PP gave their expert opinion on histology that was taken during autopsy examination by a FP. In four of the seven cases involving PP input, the cause of death was not obviously forensic while in three cases, there was clear evidence of traumatic injury.

Cause of death: 13-17 years' old

There were 20 forensic paediatric autopsies performed in the 13-17-year age group from 2012-2017. The most common causes of death in this group were: road traffic accidents (n=6), drug intoxication (n=5) and homicide (n=4). Other causes of death included: suicide (n=2), accidental drowning (n=1), neck entrapment (n=1) and in 1 case, the cause of death was undetermined.

Autopsy standards

There were 12 perinatal deaths in our audit. These cases were scrutinised and compared with the standards referenced above. While the vast majority of guidelines were met, the autopsy reports consistently fell short of the guidelines in some aspects. There were no centiles recorded regarding babies' bodyweights in any case and in one case, there was no documented baby weight (this case was performed by a lone FP). In 10 of the cases, there was no comment on the degree of organ development with respect to the age of the baby. In 10 cases, there was no explicit statement on the presence or absence of infection and in five cases there was no statement on the presence or absence of malformation. In 9 of the cases, there were no reference values or ratios given with the measured organ weights and in three cases, there is no documentation of any organ weights at all (these three cases were performed by a lone FP). There was a list of histology blocks recorded in just two of the 12 cases, both of which involved input from a PP. On examination of all SIDS/SUDI cases, the National SIDS Autopsy Protocol was used as a reference. None of the case files had autopsy reports with an exhaustive adherence to the protocol in terms of reporting on individual physical features, taking histology and measuring weights of certain tissues.

Discussion

Forensic pathologists are medical doctors who are trained in interpreting both pathological disease and traumatic injury at autopsy to aid a medicolegal death investigation. Forensic paediatric autopsy involves determination of the cause of death in a child where death has occurred in suspicious circumstances. These cases demand careful consideration of the possibility that criminal activity may have contributed to the death. The expertise of a forensic pathologist is vital here, as their expert examination and subsequent report are integral parts of death investigation and the criminal justice system. More importantly, they contribute to the overall safeguarding of children in Ireland.

However, interpretation of paediatric pathology at autopsy is highly specialised, and it is necessary that an appropriately trained medical professional is involved in the examination⁸. The British Association in Forensic Medicine recommend that it is best practice for both a forensic and paediatric pathologist to be involved at the autopsy examination in these cases⁹.

This review observed 18 cases where no apparent indication was stated for a forensic paediatric autopsy. The deaths were all either natural or birth-related and the need for input from the FP was questionable. Two thirds of these cases were referred from outside Dublin and may reflect the lack of available PP expertise outside Dublin during this time period⁷. We would recommend that in a child's death, where there are no suspicions raised, the expertise of a paediatric pathologist (PP) should be sought in the first instance⁸. A FP may then be involved following assessment by the PP.

The results highlight the differences in the causes of death between different age groups in cases referred to the OSP. In children aged >3, the majority of deaths were due to unnatural causes. In the 22 of 79 forensic paediatric cases, attended by a PP, the cause of death in 18 cases was natural. Perinatal and infant autopsy pathology is significantly different to adult autopsy pathology and requires input from a specialist. Given the high level of expertise required, the Royal College of Pathologists and the Royal College of Paediatrics and Child Health recommend that PP input should be sought in all cases of perinatal and infant deaths, regardless of whether input from a FP is warranted⁸. Furthermore, our review has shown when a PP was the lead pathologist at autopsy, there appeared to be a better adherence to paediatric autopsy guidelines. This finding reaffirms the need for subspecialist involvement for a more robust investigation.

There were 6 cases of infant deaths included in this review where the cause of death was undetermined. A PP was involved in just one of these autopsies. It is possible that the specialist opinion provided by a PP in the other five cases could have contributed towards a more definitive cause of death. The input of the PP at autopsy examination in children aged <3 should always be considered for accurate death categorization, even if there is an obvious forensic element.

In conclusion, paediatric deaths where there are suspicious or traumatic elements should potentially be referred to the OSP. However, the involvement of a paediatric pathologist should always be considered and discussed with the coroner. In non-suspicious paediatric deaths, our review has shown that reporting guidelines are better adhered to when a paediatric pathologist performs the autopsy. These cases should be referred to a paediatric pathologist first. Forensic pathologists should refer to the Royal College of Pathologists' guidelines when performing paediatric autopsies to ensure that the highest standards of autopsy examination are met.

Declaration of Conflicts of Interest:

The authors have no conflicts of interest to declare.

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