Improving the quality of perinatal and infant necropsy examinations: a follow up study

G M Vujanić, P H T Cartlidge, J H Stewart

Abstract

Aim—To compare the quality of perinatal and infant necropsy examinations in 1996 with those performed in 1993.

Methods—Cohort analysis, with data from the All Wales Perinatal Survey, of 1027 deaths (540 in 1993; 487 in 1996) of babies between 20 weeks’ gestation and one year of age. The quality of the necropsy was assessed by scoring aspects identified as being part of the investigation.

Results—Necropsy was performed in 335 cases (62%) in 1993 and in 320 cases (66%) in 1996. The proportion done in a regional centre increased significantly from 39% (131/335) in 1993 to 76% (243/320) in 1996 (p < 0.0001). The quality of necropsy was above the minimum standard in 54% of cases in 1993 (171/314) compared with 93% in 1996 (289/312) (p < 0.0001). Improvement occurred in all categories. For stillbirths, 35% (46/133) were above the minimum standard in 1993 compared with 90% (104/116) in 1996 (p < 0.0001); for cases not classified as sudden unexpected death in infancy (SUDI), the improvement was from 62% in 1993 (40/65) to 97% in 1996 (73/75) (p < 0.0001); and for SUDI cases, the improvement was from 32% in 1993 (10/31) to 91% in 1996 (21/23) (p < 0.0001). The quality of both non-regional and regional necropsies improved. For non-regional cases, the score was above the minimum standard in 28% (51/183) in 1993 compared with 69% (52/75) in 1996 (p < 0.0001); for regional cases it improved from 92% (120/131) in 1993 to 100% (237/237) in 1996 (p < 0.0001).

Conclusions—The quality of perinatal and infant necropsies improved considerably between 1993 and 1996, reflecting better awareness of the importance of good quality examination and an increase in referrals to paediatric centres.

Keywords: audit; perinatal; infant; necropsy

A necropsy examination is important in identifying the cause of death and as a means of auditing clinical practice. Clinically significant information found at necropsy has been reported in 14–46% of perinatal and infant examinations, and in many cases it discloses the cause of death. The quality of the necropsy examination is also important since clinically relevant information is more likely to emerge from a high quality investigation. Yet the quality of many perinatal and infant necropsies has been criticised. The Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI) found that 43% of necropsy reports were less than adequate. Systematic reviews of the quality of necropsy examinations have confirmed the problem. In Wales, we found that 46% of perinatal and infant necropsies done during 1993 were below the desired standard, and similar findings have been reported from West Midlands, East Anglia, Northern England, and Northern Ireland.

There have been several changes in recent years aimed at improving the situation. In 1993 the Royal College of Pathologists issued Guidelines for Postmortem Reports to update a working party report on fetal and perinatal pathology published in 1988. The CESDI annual reports and other publications have highlighted the importance of a high quality necropsy and encouraged the use of a more centralised and specialist service. In Wales, we also convened regional and local seminars to highlight the value of a high quality necropsy investigation and emphasised that it should either be done according to the College’s Guidelines or referred to a regional paediatric pathology centre where all necessary facilities were available. In this paper we re-evaluate the quality of perinatal and infant necropsy examinations in the light of these initiatives, by comparing the quality of the examinations performed in a geographically defined population in 1996 with those done in 1993.
Improving perinatal and infant necropsy examinations

The cases were divided into four groups: fetal deaths at 20 to 23 weeks of gestation, stillbirths, sudden unexpected deaths in infancy (SUDI), and other infant deaths (non-SUDI). As in our previous study, the quality of each necropsy report was assessed using a modification of the system described by Rushton, which objectively scores aspects identified by the Royal College of Pathologists as being part of a necropsy (table 1). Six aspects of the infant necropsy (body measurements, organ weights, histology, radiology, microbiology, other relevant investigations) were assessed, giving a maximum score of 600. The necropsy after a fetal death should also include an examination of the placenta, so the maximum score was 700. The minimum acceptable score was also based on the Royal College of Pathologists guidelines, and for the fetal necropsy it was set at 350 (body measurements, organs weights, main organ histology, and examination of the placenta). The infant necropsy does not include the placental examination and so the minimum acceptable score for non-SUDI cases was 250. The necropsy for SUDI cases includes the placenta, so the maximum score was 600. The necropsy after a fetal death should also include an examination of the placenta, so the maximum score was 700. The minimum acceptable score was also based on the Royal College of Pathologists guidelines, and for the fetal necropsy it was set at 350 (body measurements, organs weights, main organ histology, and examination of the placenta).

Statistical analysis used 95% confidence intervals for the means, and the χ² test to compare two proportions.

Results
A necropsy examination was performed on 62% of cases in 1993 (335/540) compared with 66% (320/487) in 1996. The proportion done in a regional paediatric pathology centre increased significantly from 39% (131/335) in 1993, to 76% (243/320) in 1996 (p < 0.0001). In 20–23 weeks’ gestation fetal deaths it increased from 84% (71/85) to 92% (90/98), in stillbirths from 23% (31/135) to 69% (81/118), in non-SUDI cases from 29% (22/75) to 70% (57/81), and in SUDI cases from 18% (7/40) to 65% (15/23).

Twenty two necropsy reports were unavailable for assessment, and in seven cases only a limited necropsy examination was performed, so 626 cases (314 in 1993, and 312 in 1996) were included in the analysis. Overall the scores for the quality of the necropsy report increased significantly from a mean (95% confidence interval) of 306 (289 to 322) in 1993 to 454 (444 to 464) in 1996, with significantly higher scores in each subgroup of cases (table 2).

Scores for the quality of the necropsy report were above the minimum acceptable score in 54% of cases in 1993 (171/314) compared with 93% (289/312) in 1996, a highly significant increase (p < 0.0001). The proportion with a quality score above the minimum acceptable level improved in stillbirths from 35% (46/133) in 1993 to 90% (104/116) in 1996 (p < 0.0001); in non-SUDI cases from 62% (40/65) to 97% (73/75) (p < 0.0001); and in SUDI cases from 32% (10/31) to 91% (21/23) (p < 0.0001). The proportion of 20–23 week fetal deaths with a score above the minimum acceptable level was similar in 1993 (88%) and 1996 (93%).

The quality score for necropsy reports from both non-regional pathology and regional paediatric pathology services improved between 1993 and 1996. The score for the non-regional necropsy reports increased significantly from 228 (210 to 246) in 1993 to 349 (327 to 371) in 1996, and the proportion of scores above the minimum acceptable level improved from 28% (51/183) to 69% (52/75) (p < 0.0001). Similarly, for regional cases the score increased from 414 (399 to 430) in 1993 to 487 (481 to 494) in 1996, with the proportion above the minimum acceptable score improving from 92% (120/131) to 100% (237/237) (p < 0.0001).

Changes also occurred in the provision of necropsy services in individual hospitals. In
1993, only three of 16 hospitals were using the regional paediatric pathology services for 50% or more necropsy examinations compared with 11/16 in 1996 (table 3). This change was reflected in an improvement in the quality score in all hospitals dealing with fetal and infant deaths.

Discussion

The quality of perinatal and infant necropsy examinations in Wales has improved significantly in recent years. In 1993 the standard of necropsies in stillbirths and infant deaths was poor, although the quality of examinations in late fetal losses (20–23 weeks’ gestation), most of which were done in a regional paediatric pathology centre, was satisfactory. By contrast, good quality necropsies were performed on 90% or more stillbirths and infant deaths in 1996, and the standard of the examination on late fetal losses was also better. Improvement was most pronounced for necropsies in SUDI, particularly important since even detailed necropsy examinations and falling necropsy rates were published, and the use of specialist perinatal pathology services encouraged, particularly for complex cases. Dissemination of these findings resulted in a sharp increase in the use of centralised services in Wales, from 39% of necropsies in 1993 to 76% in 1996. It may also have halted or maybe reversed the declining necropsy rate.

The higher standard of necropsy examinations in Wales was not only due to a centralisation of paediatric pathology services; the quality of investigations improved regardless of where they were performed. In non-regional centres, 69% of necropsies were of a good standard in 1996, compared with only 28% in 1993, and a smaller but significant improvement was also evident in regional centres, from 92% being of good quality in 1993 to 100% in 1996. We speculate that this was the result of an increased use of the Royal College of Pathologists guidelines, and a higher priority being given to perinatal and infant necropsies.

CONCLUSION

Significant improvements in the quality of perinatal and infant necropsy examinations correlate with an increased use of specialist paediatric pathology services. Moreover, the standard of necropsies in general is improved by highlighting the importance of the investigation. Nevertheless, we have used minimum standard to assess the quality of perinatal and infant necropsies, and the data are reported anonymously. Further improvement requires the identification of individual poor performers to allow remedial action to be taken.

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Table 3 Quality of perinatal and infant necropsy examinations in 1993 and 1996 according to the hospital of death

<table>
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<th>Hospital of death</th>
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<th>Mean score</th>
<th>Regionally performed necropsy (%)</th>
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CI, confidence interval.

References

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