

CORRESPONDENCE

Commentary on Blanco-Pampin JM. Suicidal deaths using fireworks. *J Forensic Sci* 2001;46(2):1526–1528

Sir:

We found Dr. Blanco-Pampin's article interesting and timely as we had two suicidal deaths involving solid explosives in our jurisdiction in 1999. A review of our records from 1995–2000 revealed one additional example of this unusual and rarely documented phenomenon. Like the author's cases, our victims were all male (and to our knowledge no female cases have ever been reported) and all showed extensive direct blast injuries of the head, with obliteration of the head, chest and proximal upper extremities in one case. It was unclear from our reading whether the author's victims employed more readily available recreational fireworks in committing suicide or whether commercial solid explosives were employed. Case reports of both types exist (1,2). In our cases, one involved the use of a recreational "quarter-stick" firework, which the decedent was observed to place in his mouth and light. The other two cases involved the intraoral detonation of a commercial blasting cap and the detonation of an unknown amount of dynamite with the decedent in a kneeling or prone position. The former case involved an explosives salesman and the latter an employee of a demolition company. It would be curious to know if the reported decedents' occupation or previous employment required familiarity with explosives and whether they had ready access to explosives. In one large series (3) these factors were present in over half of the 25 cases reported. Our thanks to Dr. Blanco-Pampin for his thorough report.

Deborah Mitchell, M.S.
Thomas Gilson, M.D.
Office of Chief Medical Examiner
State of New Hampshire
Concord, NH

References

1. Varga M, Csabai G. A suicidal death by explosives. *Int J Leg Med* 1992;105:35–7.
2. Davis E, Rollins C, Reiber G, Anthony R. Suicide by pipe bomb. *Am J Forensic Med Pathol* 1999;20(2):136–40.
3. Rajs J, Moberg B, Olsson J. Explosion-related deaths in Sweden—a forensic pathologic and criminalistic study. *Forensic Sci Int* 1987;34: 1–15.

Author's Response

Sir:

I would like to thank D. Mitchell and T. Gilson, of The Office of Chief Medical Examiner of New Hampshire (USA), for their comments regarding my article, of two cases of suicide using fireworks (1).

In their letter they make a series of interesting observations regarding the previous occupations of victims and their familiarity

with the handling of explosives. In addition, they provide a review of their records with personal experiences, similar to the ones in my article, which are particularly valuable.

In the cases reported, both individuals committed suicide by available recreational explosives. Neither of them had previous employment related to explosives. In Case 2, the victim had used flare rockets for entertainment in fun and games. In Case 1, familiarity with explosives was investigated, but remains unclear.

Spanish legislation concerning fabrication, transportation and use of firearms and commercial solid explosives is very limiting (2). All related activities are under severe control by the Ministry of Industry and the Police Department (Guardia Civil). Nevertheless, recreational fireworks (pyrotechnics) restrictions are minimal. Those of an adult age who wish to, can purchase them.

References

1. Blanco Pampin JM. Suicidal Deaths Using Fireworks. *J Forensic Sci* 2001;46(2):402–5.
2. Legislación sobre armas y explosivos. 3rd. Ed. Tecnos. Madrid, 2000.

J.M. Blanco Pampin, M.D.
Palacio de Justicia
c/Viena s/n
15701 Santiago de Compostela
Galicia-España

Commentary on Rubocki RJ, McCue BJ, Duffy KJ, Shepard KL, Shepard SJ, Wisecarver JL. Natural DNA mixtures generated in fraternal twins *in utero*. *J Forensic Sci* 2001;46(1):120–125.

Sir:

In the above cited article, the authors describe a phenomenon of the *in utero* exchange of haematopoietic cells between fraternal twins. The resulting chimerism in the blood of the twin tested (the suspect) gave a DNA profile which appeared to be a mixture. Four of the nine STR loci test gave a result with two major alleles and a third minor allele.

In looking for alternative explanations for the mixture, the authors stated that the suspect received neither a bone marrow transplant nor a blood transfusion.

Although bone marrow transplants may cause mixed DNA profiles, we have demonstrated that blood transfusions in no way alter a recipient's DNA profile. (Brauner P, Shpitzen M, Freund M, Manny N. The effects of blood transfusions on PCR DNA typing at the CSF1PO, TPOX, TH01, D1S80, HLA-DQA1, LDLR, GYPA, HBG, D7S8 and GC loci. *J Forensic Sci* 1997;42(6): 1154–1156). In our study, eight individuals received a total of 1–18 units of blood or blood products. In no case, was the DNA profile of the recipient altered by the transfusions.

In a related case, investigators found that a stabbing victim had the same DNA profile before as after a transfusion. (Davidson AK and Lee LD). Unusual results due to transfused blood. *Science and Justice* 1999;39(3):179–180.

With this communication, we hope to inform readers of the article by Rubocki et al. of the finding that blood transfusions are not a factor that alter DNA profiles.

Paul Brauner
Forensic Biologist
Forensic Biology Laboratory
Israel Police National HQ
Jerusalem, Israel 91906

Author's Response

Sir:

We appreciate Mr. Paul Brauner's comments concerning our article. We have had a similar experience with STR testing on patients who have received multiple blood product transfusions, having never found evidence of a mixture. In the case described in our article, we wanted to exclude all potential sources that could have resulted in a mixed sample. Consequently, for completeness, we inquired whether this may have occurred, knowing that it was quite unlikely to produce the results we detected. We agree with the observations cited in the references he has provided. Blood transfusions will not alter STR typing results under most circumstances.

Ronald Rubocki, Ph.D.
James Wisecarver, M.D., Ph.D.
Human DNA Identification Laboratory
University of Nebraska Medical Center
Omaha, NE 68198

Commentary on Muñoz JI, Suárez-Peñaranda JM, Otero XL, Rodríguez-Calvo MS, Costas E, Miguéns X, Concheiro L. A New Perspective in the Estimation of Postmortem Interval (PMI) Based on Vitreous [K^+]. J Forensic Sci 2001;46(2):209–214.

Sir:

The importance of the recent paper by Muñoz et al. cannot be overstated. Their assertion that the PMI (post mortem interval) must be deployed as the independent variable, and the K^+ as dependent in any regression based procedure used to establish a calibration function for PMI is entirely correct. This is because the converse arrangement must lead to bias, where estimates for short PMI's are systematically longer than the real PMI, and estimates for long PMIs shorter than the real PMI. The magnitude of the bias being equal to $1-r^2$ where r is the correlation coefficient, and follows as a result of the algebra of regression analysis. As r^2 in this case is relatively small the potential bias is therefore large. A formal proof is given by Aykroyd et al (1), resulting from their work on age estimation and regression analysis. The same result can be found in the work of Eisenhart (2) and Draper and Smith (3).

It is important that all those in the forensic science community who employ regression analysis to derive calibration functions do so fitting the variables the correct way round. There are no hard and fast rules about which way as it is determined largely upon the dependency structure of the system. A useful *rule of thumb* is that the variable which is not affected by the other is the independent (x). This is easy to see in the case of K^+ and PMI as the level of K^+ cannot affect the PMI, the PMI affects K^+ . In other cases the position may not be so obvious, and the forensic scientist may have to consult a statistician.

References

1. Aykroyd RG, Lucy D, Pollard AM, Solheim T. Regression analysis in adult age estimation. *Am J Physical Anthropol* 1997;104(2):259–65.
2. Eisenhart C. The interpretation of certain regression methods and their use in biological and industrial research. *Annals of Mathematical Statistics* 1939;10:162–86.
3. Draper NR, Smith H. *Applied regression analysis: second edition*. John Wiley and Sons, 1981.

David Lucy, Ph.D.
Center for Forensic Statistics and Legal Reasoning
Department of Mathematics and Statistics, King's Buildings
The University of Edinburgh
Edinburgh
EH9 3JZ, UK

Robert Aykroyd, Ph.D.
Department of Mathematics and Statistics
University of Leeds
Leeds West Yorkshire, LS2 9JT, UK

Mark Pollard, D.Phil.
Department of Archaeological Sciences
University of Bradford, Bradford
West Yorkshire
BD7 1DP, UK

Authors' Response

Sir:

We thank David Lucy et al. for their observations on our paper, *A New Perspective in the Estimation of Postmortem Interval (PMI) Based on Vitreous [K^+]* and also the editor of JFS for inviting us to reply.

We fully endorse their comment that the forensic scientist may have to consult a statistician, and would like to add that we are fortunate in not only having the support of a statistician, but also one with a background in forensic science.

In any work requiring regression analysis, bias limitation is of utmost importance. The magnitude of bias would be minimal in a supposed case where the correlation coefficient (r) is very near 1. In all situations where the value of r^2 moves away from this ideal value bias will persist, and this has been the case in the formulae used until now to estimate PMI by regression analysis. All formulae should present a high r^2 and be accompanied by a correct choice of variables in order to be applied to forensic work: what is needed is to estimate PMI from a known value of vitreous [K], and not to estimate vitreous [K] from PMI.

This is evident not only in the known and solved case of stature (1,2) but also for substances such as Hypoxanthine (Hx), in the estimation of PMI, in which we are currently engaged in on-going studies (3) and have found that the literature is plagued with a similar and persistent error in the choice of independent variable.

We feel that if the full data of previous studies had been made available together with the mathematical analysis (as in our case), such errors would certainly have been detected much earlier.

References

1. Aykroyd RG, Lucy D, Pollard AM, Solheim T. Regression analysis in adult age estimation. *Am J Phys Anthropol* 1997;104(2):259–65.
2. Muñoz JI, Liñares-Iglesias M, Suárez-Peñaranda JM, Mayo M, Miguéns X, Rodríguez-Calvo M, et al. Stature estimation from radiographically determined long bone length in a Spanish population sample. *J Forensic Sci* 2001;46(2):363–6.
3. Costas E, Concheiro L, Suárez-Peñaranda JM, Rodríguez-Calvo MS, López-Rivadulla M, López de Abajo B, et al. De nouvelles perspectives dans l'estimation de la date de la mort d'un cadavre récent. In: Vieira DN, Rebelo A, Corte-Real F, editors. *Temas de Medicina Legal II*. Coimbra: Centro de Estudos de Pós-Graduação em Medicina Legal. In press.

José I. Muñoz, M.D., Ph.D.
Institute of Legal Medicine
University of Santiago de Compostela.
Spain

José M. Suárez-Peñaranda, M.D., Ph.D.
Institute of Legal Medicine
University of Santiago de Compostela.
Spain

María S. Rodríguez-Calvo, M.D., Ph.D.
Institute of Legal Medicine
University of Santiago de Compostela.
Spain

Xosé L. Otero, PhD.
Statistic Unit
Faculty of Medicine
University of Santiago de Compostela.
Spain

Luis Concheiro, M.D., Ph.D.
Institute of Legal Medicine,
University of Santiago de Compostela,
Spain