Forensic investigations after sexual abuse of several infants: a criminal case report.

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INTRODUCTION

Sexual violence against women and sexual abuse of male and female infants are crimes of major social importance and form a large part of the forensic stain analysis work. The development of sensitive forensic DNA analysis techniques based on the polymerase chain reaction (PCR), e.g. HLA-DQα (Saiki et al. 1989; Schneider and Rittner 1993), D1S80 (Budowle et al. 1991) and Amplitype PM (Budowle et al. 1995), as well as the selective lysis procedure to enrich sperm cells (Giusti et al. 1986) highly facilitated stain analysis with these crimes. Here we report on a successful collaborate search for a sexual offender of young girls based on concommitant criminal investigations and forensic DNA analyses.

CASE REPORT

Materials and Methods

DNA was isolated from vaginal swabs and underwear after selective lysis and from blood samples using standard forensic methods with small modifications (Kreike and Lehner, 1995). PCR (HLA-DQα, D1S80 and PM) and the analysis of the amplified products were performed as described by the supplier (Perkin-Elmer/Cetus), except that the number of cycles during D1S80 amplification was increased to 32. D1S80 allele frequencies and distribution of HLA-DQα and PM genotypes were taken from Hochmeister et al. (1994).

Results

In the first week of June 1994 four girls, between 9 and 12 years of age, were sexually abused. Medical examination did not show major injuries of the abdomen, nor indications of defloration. Serological examination revealed sperm in vaginal secretions and underwear from two of the victims. Since all four cases showed prominent similarities in the course of events presumably a single offender was involved. This assumption was confirmed by HLA-DQα analysis of sperm enriched fractions from the stains. In the vaginal swab from victim #1 HLA-DQα alleles 2 and 3 were present in addition to the female alleles 1,3 and 4. Also in the slip from victim #2 HLA-DQα allele 3 was present in combination with alleles 2 and 4 from the girl itself (Fig. 1). From the other two victims no sperm containing material could be identified.

Several months later, between September and November 1994, three more girls were abused in a similar way. From one of them (victim #3) sperm was detected in vaginal and anal swabs and the underwear. In DNA isolated from the sperm stain in the slip again HLA-DQα alleles 2 and 3 could be determined in addition to the alleles 1.1 and 4 from the victim (Fig. 1). A still unsolved earlier case of infant sexual abuse was compared with these three current cases. A sperm stain on

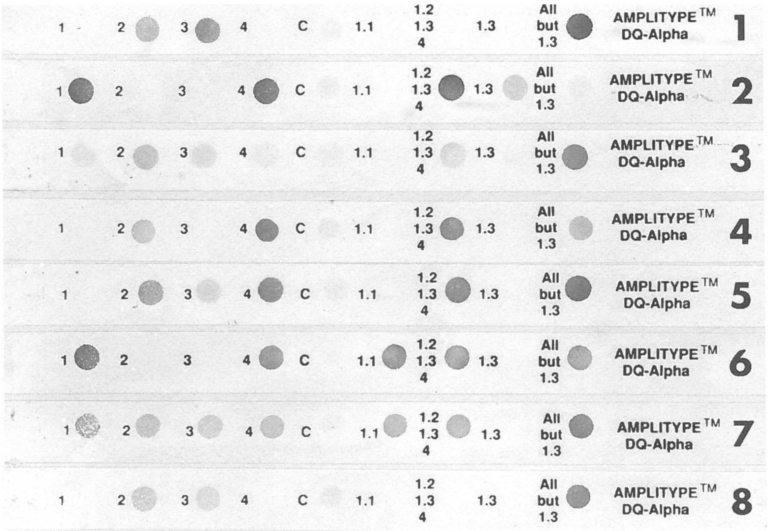

Fig. 1: Results of HLA-DQα analysis of blood samples and stains. *Strip 1:* blood, suspect; *strip 2:* blood victim #1; *strip 3:* stain, victim #1; *strip 4:* blood, victim #2; *strip 5:* stain, victim #2; *strip 6:* blood, victim #3; *strip 7:* stain, victim #3; *strip 8:* stain, victim #4.

a girl´s jacket from January 1994 was analysed and it showed HLA-DQα alleles 2 and 3 (Fig. 1). These results were confirmed by D1S80 analysis of the stains, which all showed D1S80 alleles T24 and T25, and by PM analysis (data not shown). The frequencies of HLA-DQα alleles 2 and 3 and D1S80 alleles T24 and T25 were calculated to be 0.04 % (Hochmeister et al. 1994). The similarities in the crimes and the forensic DNA results prompted us to perform a computer search of known sexual offenders in Austria. From over 3000 possible candidates 6 were selected out using several criteria: offenders known in Vienna, personal description, no additional crimes (drugs or brutal violence), place of crime or living appartment in three viennese districts, not in prison at the time of the crime. On photographs of these six men, two closely resembled the personal description of the offender and one of them was unequivocally identified by one of the victims.

The putative offender, who had been convicted of four similar crimes in 1986, was arrested at his place of work and, after he had been told that DNA analysis from the stains may prove his guilt, he made a partial confession. Later he admitted sexual abuse on nine girls between 6 and 12 years old, one of which is still unidentified. He was sentenced to 12 years imprisonment in May, 1995.

Discussion

After HLA-DQα, D1S80 and PM analysis the probability of this man to be the offender lies between 99.7% (victim #2)and 99.9998% (victim #4). However, due to his confession to the authorities and in court, in this particular case these probabilities should not be interpreted primarily as strong evidence for sexual abuse by this accused man. The primary result from the forensic analyses is the presence in the swabs and underwear of sperm cells, which highly likely originate from the suspect. This indicates clear evidence for executed sexual intercourse with three of the victims.

	victim #1 (12 years)		victim #2 (9 years)		victim #3 (8 years)		victim #4 (7 years)		accused man
	blood	stain	blood	stain	blood	stain	blood	stain	blood
HLA-DQα	1,3 4	1,3 2 3 4	 2 4	 2 3 4	1,1 4	1,1 2 3 4	n.d.	 2 3	 2 3
D1S80	T18 T26	T18 T24 T25 T26	T18	T18 T24 T25	T18 T24	T18 T24 T25	n.d.	 T24 T25	 T24 T25
LDLR	AB	AB	n.d.	n.d.	AB	AB	n.d.	AB	AB
GYPA	AA	aB	n.d.	n.d.	AA	AB	n.d.	BB	BB
HBGG	BB	AB	n.d.	n.d.	BB	aB	n.d.	AB	AB
D7S8	BB	Ab	n.d.	n.d.	AA	AA	n.d.	AA	AA
GC	BC	BC	n.d.	n.d.	AC	abC	n.d.	BC	BC
genotype frequency (%)		0.002		0.3		0.1		0.0002	

Fig. 2: Schematic presentation of the results of HLA-DQα, D1S80 and PM analysis of DNA from stain material (sperm enriched fractions) from four sexually abused female infants. Weak PM alleles are indicated by small letters; n.d., not done

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