Possible False Inclusion of Motherless Paternity Analysis with Related Putative Father

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Abstract- Paternity testing analysis aims to determine whether or not an allele parent is the biological parent of the child. If so, each allele of a child should match one allele of each parent. The most common technique used in paternity testing is the identification of short tandem repeat loci in order to evaluate the DNA evidence whether a man is not excluded by the paternal allele. In this case, a death victim was investigated. Two relatives, daughter and brother, were available for analysis. The VerifilerPlus™ PCR amplification kit was used for the investigation. We analyzed paternity testing of a child and putative father, by chance we found that a child and uncle shared 21 STRs loci. This study has shown a case which can be false inclusion if it were requested only a child and a relative of the biological father. The results suggest that for motherless paternity cases the use of 21 STR markers are not enough for investigation.

Keywords: Duo paternity, Motherless, STRs, VerifilerPlus™

I. Introduction

DNA analysis has become an important tool in forensic identification and paternity testing [1]. The application of Short Tandem Repeats (STRs) allows the investigation of multiple loci typing using multiplex-PCRs followed by automatic fluorescent detection [2]. Paternity case could be the TRIO cases, both parents of the child are available, and the DUO cases, the absent of DNA profile of one parent. Many paternity cases are carried out with only a child and the putative father due to the limitation of the family or many others reasons. The problems maybe arise when a child and the relative of the biological father were investigated [3-5]. This case, death victim was investigation. Two possible relatives (daughter and brother) were available for analysis. The genetic data were established for the paternity testing.

II. Material and Methods

A. STR profiling

Two buccal swabs from each individual was extracted using QIAamp DNA Mini and Blood Mini kit (Qiagen, Hilden, Germany) [6] and tissue sample from the death victim was extracted using QIAamp DNA Investigator kit (Qiagen, Hilden, Germany) [7] according to the manufacturer's instructions. The samples were quantify using Quantifiler™ HP DNA Quantification kit (Thermo Fisher Scientific, Waltham, MA) [8]. PCR amplification was performed as manufacturer recommendations for the VerifilerPlus PCR amplification kit [9] using ProFlex™ Thermal cycler (Thermo Fisher Scientific, MA, USA). PCR products were detected on Applied Biosystem 3500xl Genetic Analyzer (Thermo Fisher Scientific, MA, USA). The raw data were analyzed using GeneMapper ID-X ver 1.6 software (Applied Biosystems, CA, USA) [10].

B. Statistical analysis

Paternity Index was calculated using GenoProof 3 (Qualitype, Dresden, Germany) [11].

III. Results

The genetic profiles of tested samples were shown in Table 1. All loci were successfully typed. We analyzed duo case with VerifilerPlus™ kit. The analysis showed a genetic compatibility between a child and death victim (Probability of paternity= 0.999999998915). Considerably, the analysis showed two genetic mismatched between a child and her uncle (Penta E and D2S1338). A paternity index was calculated and the paternity value (21 STRs loci) is also high (P Probability of paternity =0.999999994594).

IV. Discussion

The results suggested that the problems of deficiency cases investigation maybe arise when a child is investigated with a relative of the biological father as father/daughter relationship. In this case, two mismatch loci between a child and uncle were observed, no exclusion were found when 21 STRs were analyzed. This case illustrated the important of including maternal profiles in paternity testing. Furthermore, due to the

absence of the mother, the investigation should be carried out as many loci as possible in order to resolve the problem.

Table 1 The DNA profiles of the death victim, child and brother.

STR locus	Corpse	Child	Brother
1 D3S1358	15–17	16–17	15–17
2 vWA	14–16	16–18	16–16
3 D16S539	10–12	10–12	10–12
4 CSF1PO	10–11	11–11	11–11
5 D6S1043	11–13	13–17	11–13
6 Yindel	1	–	1
7 D8S1179	11–13	13–16	13–15
8 D21S11	30–31.2	29–30	30–30
9 D18S51	15–15	14–15	15–15
10 D5S818	7–7	7–11	7–10
13 D2S441	11.3–12	11.3–12	12–14
14 D19S443	12–15.2	15.2–16.2	12–15.2
15 FGA	18–26	18–21	18–21.2
15 D10S1248	13–16	13–16	13–13
17 D22S1045	11–16	11–15	15–15
18 D1S1656	13–14	13–15	13–14
19 D13S317	9–12	12–12	11–12
20 D7S820	8–11	8–10	8–10
21 Penta E	7–12	11–12	13–15
22 Penta D	10–11	11–12	10–11
23 TH01	9–9	9–9	9–9
24 D12S391	19–22	17–19	19–23
25 D2S1338	16–20	19–20	16–24
26 TPOX	11–11	8–11	11–11
27 Amelogenin	XY	XX	XY

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