



Original communication

Evaluation of incest cases of Turkey in terms of DNA profiling difficulties



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ABSTRACT

We scanned suspicious 1200 paternity cases and 650 sexual abuse victims in Council of Forensic Medicine of Turkey between 2011 and 2014 and detected 50 incest cases and evaluated the forensic and genetic data of incest cases for source of DNA evidence, gender, age, SES (Socioeconomic status) and geographic location of victim, abusive person, extent of incest, pregnancy from incest and date of gestation termination and also aimed to discuss some DNA profiling difficulties.

We detected incest from DNA evidences of curettage material (34%; Chorionic Villi (12%) and fetal tissue (22%)), alive baby after pregnancy (28%), sperm in vaginal swab (10%), sperm in anal swab (2%), sperm on clothing (24%) and in one case both sperm on clothing and in vaginal swab (2%). It was found that the most common incestuous relationship was elder-brother-sister incest (34%) and the second most common relationship was father-daughter incest (28%). The rarest incest was mother-son incest with only one reported case (2%). Forty-three victims (86%) were younger than 18 years old and 7 victims (14%) were older than 18 years old. Thirty-eight cases described full sexual intercourse and 31 of them culminated in pregnancy and 14 of them gave birth at the end of pregnancy.

We had paternity rejection problem 3 (10%) of 31 incest cases between tested genetically related alleged fathers. Totally 20 STR loci did not discriminate the alleged fathers in two cases and we treated this problem increasing the number of STR loci and finally got the discrimination.

In one case we detected same triallelic variant pattern at the same D3S1358 STR locus in both tested parents but child had not got STR variant; had only two alleles at this loci. We then evaluated the peak height values of STR variant alleles of tested persons and concluded a tetra-allelic baby without any STR incompatibility of 15 STR loci.

Finally, forensic experts should aware of some DNA profiling difficulties while analyzing paternity incest cases due to increasing intra familial allelic share. We suggested that first try increasing the number of compared STR loci and secondly use alternative genetic markers and also be careful while evaluating triallelic STR variants.

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1. Introduction

Although incest is defined as a sexual activity between first-degree relatives including father-daughter, mother-daughter, or brother-sister, the definition has been expanded with addition of

sexual activity with step-father, uncle, niece, grandfather, and grand kids.^{1–4} Incest has been an under-reported complex situation with genetic, psychiatric and sociological aspects. Therefore, it is classified as a ‘Silent health emergency’ by World Health Organization.⁵ The most common incest types are father-daughter incest, and second most common incest is brother-sister incest.⁶ Incestuous relationship with a first-degree relative affects victim’s psychology and life much more than the other types.⁷ Victims of incest usually do not talk about this situation due to embarrassment, guilt, and fear. Thus, incest cases are rarely reported. Moreover, trying to cover-up incest cases by families is a well-known reality.^{8,9} It is thought that only a small amount of

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incest cases are successfully uncovered in Turkey similar to other conservative countries.

Although DNA profiling technology has been used in forensic laboratories for both paternity analysis and criminal investigations of sexual abuse cases, we need to capture the status in rarely reported incest cases. We also discussed difficulties of DNA profiling between genetically related family members.

2. Material and methods

We scanned suspicious 1200 paternity cases and 650 sexual abuse victims in Council of Forensic Medicine of Turkey between 2011 and 2014 and detected incest cases and evaluate the forensic and genetic data of incest cases for source of DNA evidence, gender, age, SES and geographic location of victim, abusive person, extent of incest, pregnancy from incest and date of gestation termination. Paternity tests of incest cases for DNA isolation from biological specimens of tested persons and curettage materials were performed with an automated DNA isolation robot (Qiagen) and the EZ1 colon filtration technique (Qiagen) according to the manufacturing suggestions. Before DNA isolation we used two types of methods for curettage material sampling. If whole fetus was curetted, fetal tissue sampling was done by inserting a biopsy needle to dead baby's skin or muscle tissue. If we had only placental curettage, fetus chorionic villi were separated from maternal tissues by visual inspection of medical genetic experts or if necessary histologically under inverted microscope (Fig. 1). All samples were crumbled using lancet after sampling and we performed DNA isolation. Sperms were detected from swabs or victims' clothes using light microscopy after hematoxylin eosin staining. DNA isolation of these suspect's sperms were performed with the M48 isolation robot (Qiagen) after differential sperm extraction. All samples were amplified using Identifiler-plus STR (Applied Biosystems) and if necessary additional 5 STR loci amplified using AmpFI investigator ESSplex (Qiagen) kits. Data analysis was performed with ABI genetic analyzer (Applied Biosystems) and GenMapper v3.5 programs.

The CPI (Combined Paternity Index) and PP (Probability of Paternity) statistics of our incest paternity cases were calculated based on Identifiler Plus (15 STR) and/or AmpFI investigator ESS Plex Plus test kits (20 STR) results of cases and Turkey population data (Our laboratory allele frequencies of 20 STRs of 500 unrelated Turkish individuals which we use in parentage calculations). Detection of paternity in our laboratory and indeed in Turkey depends on two criteria: One is PP calculations higher than 99.99% and the second is doing not detect any incompatibility between compared loci except STR mutations. On the other hand we rejected the paternity when we detected at least two STR loci incompatibility between the tested children's and alleged fathers' STR loci.

3. Results

Fifty incest cases were detected from a total of 1850 suspicious paternity and sexual abuse cases. Thirty-one of these cases (62%) were paternity cases, and 19 of them (38%) were examined as sexual abuse victims. We detected incest from DNA evidences of curettage material ($n = 17$; 34%, Chorionic Villi (12%) and fetal tissue (22%)), alive baby after pregnancy ($n = 14$; 28%), sperm in vaginal swab ($n = 5$; 10%), sperm in anal swab ($n = 1$; 2%), sperm on clothing ($n = 12$; 24%) and in one case both sperm on clothing and in vaginal swab ($n = 1$; 2%), (Table 1).

All victims were females. Forty-three cases (86%) were younger than 18 years old, while 7 cases (14%) were older than 18 years old. Thirteen (26%) cases had Middle SES and 37 (74%) cases had Low SES (Table 2). The youngest case was 15 years old with sibling incest. The most common type of incest was elder-brother-sister incest as reported in 17 cases (34%). The second and third most common types were father-daughter incest ($n = 14$; 28%), and stepfather-daughter incest ($n = 8$; 16%), respectively (Table 3). The rarest type of incest was mother-son incest observed in only 1 case (2%).

Thirty-eight cases (76%) consisted of full sexual intercourse, and 31 (62%) of them culminated in pregnancy (Table 1). Gestation was terminated in the first trimester of 17 (58.8%) pregnant cases, while

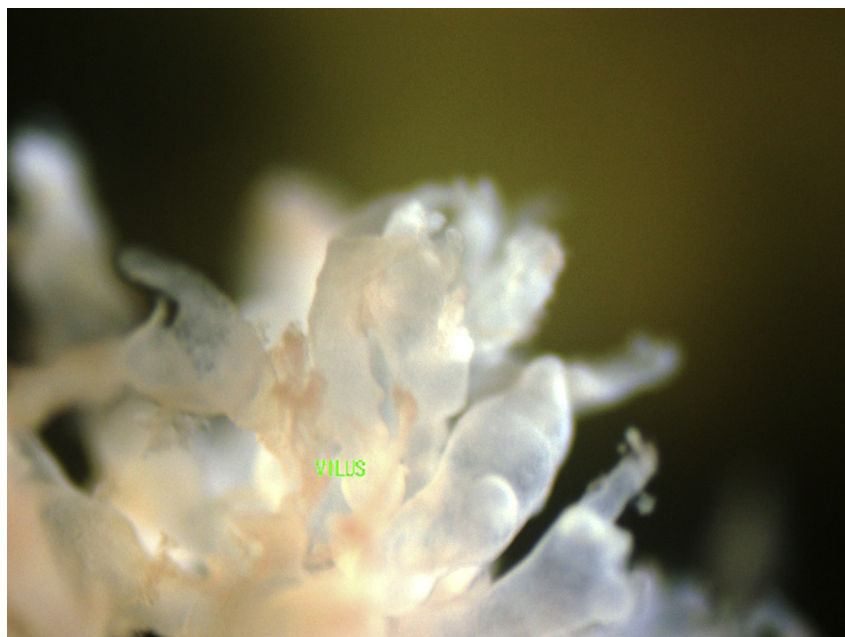


Fig. 1. Chorionic Villi under inverted microscope.

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