

DNA PATERNITY TEST AND STATISTICS FOR FATHER-DAUGHTER INCEST CASE

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ABSTRACT

Incest is sexual intercourse between close relatives (1,2) that is either illegal in the jurisdiction where it takes place or socially taboo. The type of sexual activity and the nature of the relationship between people that constitutes a breach of law or social taboo vary with culture and jurisdiction. Father-daughter was the most commonest form of incest, its prevalence is difficult to assess due to secrecy and privacy (3,4). In Iraqi law incest is a Forensic case usually referred to Medico legal Institute to be investigated with a high degree of care as a disputed paternity due to sever , danger sequel of punishment may reach to perpetrator execution. Aim of this study is to focus the light and report one of the important incest cases referred to Medical-Legal Institute .DNA profiles of 15 autosomal Short Tandem Repeat and Amelogenin markers were investigated for the (Father and father's cousin, Mother and son) in DNA Typing Department. This case was rebated according to the match of all genetic markers of DNA profile of the son with that of the putative father (Mother's Father). We conclude that the father can not be excluded from being a biological father of son who has 8 homogenous out of 15 loci suggesting high kinship relatedness between his father & mother. The Likelihood ratio was 99.99 %.

Key words: Incest, Interfamilial child sexual abuse, Disputed paternity, DNA profile.

فحص البصمة الوراثية وطأ المحارم (أب وإبنته) بتقنية البصمة الوراثية والإحصائيات الخاصة بها

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الخلاصة

زنا المحارم هو نوع من أنواع الزنا الذي يحدث بسبب علاقة جنسية غير شرعية بين الأقرباء من المحارم ويسمى أيضا " (وطأ المحارم) . إن إختلاف المجتمعات في قوانينها الاجتماعية والقضائية وإختلاف ثقافة وطبيعة كل مجتمع عن الآخر هو ما يحدد مفهوم زنا المحارم وحسب نوع النشاط الجنسي وطبيعة العلاقة والتزواج بين البشر داخل أي مجتمع. ويعتبر وطأ الأب لابنته من أكثر أنواع هذا الزنا شيوعا" في العالم إلا أنه يصعب تحديد نسبة إنتشاره بسبب سرية وتكتم العوائل المبتلاة بذلك تجنبا" للفضيحة الاجتماعية والمساعدة القانونية، أما في القانون العراقي فتعتبر قضايا وطأ المحارم من القضايا العائلية التي يحال أطرافها الى معهد الطب العدلي لغرض التحري وإجراء فحص البصمة ببالغ الأهمية والحرص وذلك بسبب خطورة القرار القضائي الذي قد يترتب الى حد إنزال عقوبة الإعدام لمقترف هذا الجرم. إن هدف هذا البحث هو تسليط الضوء على واحدة من أهم القضايا التي تم توثيقها من قضايا زنا المحارم التي وردت الى معهد الطب العدلي ببغداد. تم إجراء فحص البصمة الوراثية التي تتكون من خمسة عشر علامة وراثية لأغراض فحص المقارنة والمضاهاة بين أطراف القضية وهم (الأب المتهم -أول، ابن عم الأب المتهم - ثاني، الأم والطفل). في قسم البصمة الوراثية. تم حسم القضية ببصمة الطفل الى الأب المتهم الأول بسبب تطابق كافة علاماته الوراثية معه وعدم تطابقها مع ابن العم - المتهم الثاني وبالتالي لم ينفي فحص البصمة الوراثية بنوة الطفل لوالده البيولوجي والذي يعتبر جده من ناحية والدته أيضا"، لوحظ وجود ثمانية علامات وراثية متماثلة عند الطفل من مجموع خمسة عشر علامة ويعود ذلك بسبب وجود صلة القرابة الشديدة بين والديه البيولوجيين (أب وإبنته). إن نسبة الاحتمالية لفحص البصمة بعد إجراء الحسابات الروتينية لها هي 99,99%.

INTRODUCTION

Incest in some societies consider it to include only those who live in the same household, or who belong to the same clan or lineage; other societies consider it to include "blood relatives"; other societies further include those related by adoption or marriage (2). Father-daughter incest was for many years the most commonly reported and studied form of incest(4). More recently, studies have suggested that sibling incest, particularly older brothers abusing younger siblings, is the most common form of incest (3,5). Incest between an adult and a child is sometimes called "intrafamilial child sexual abuse"(1). Adults who as children were incestuously victimized by adults often suffer from low self-esteem, difficulties in interpersonal relationships, and sexual dysfunction, and are at an extremely high risk of many mental disorders, including depression, anxiety, phobic avoidance reactions, somatoform disorder, substance abuse, borderline personality disorder, and complex post-traumatic stress disorder (6,7). Incest is illegal in many jurisdictions. The exact legal definition of "incest," including the nature of the relationship between persons, and the types sexual activity, varies by country, and by even individual states or provinces within a country. These laws can also extend to marriage between subject individuals. A jurisdiction's definition of an incestuous relationship will also limit who a person is permitted to marry. Some jurisdictions forbid first-cousins to marry, while others limit the prohibition to brothers, sisters, mothers, fathers, aunts and uncles. In Iraqi law, religion, social, culture and Public nature considered Incest as a criminal case totally forbidden. Execution is the most if not the only punishment for perpetrator in Father –Daughter Incest.

MATERIAL AND METHODS

Case History

Responded to the Medico-Legal Institute in Baghdad from police station of Miesan Province a rape case, where the plaintiff was a girl of fourteen-year-old showed signs of fear, confusion and self-unconfidence, she accused her father (1st defendant) that he raped her several times and she became pregnant with a fetus died in childbirth and was buried for concealing the crime, the father denied the prosecution against him and accused his cousin, a young man on the basis of continued visiting to the house (2nd defendant). Here was the role of checking DNA to take over this case because of the importance of humanitarian, legal and social problems. The court has sent the father-daughter (Alleged father, Mother), 2nd defendant and biological sample from the dead fetus.

General examination (Morphological)

Physical and Gynecological examination of the raped girls to find any symptoms of pregnancy or childbirth and rape features were done.

Sample collection

Blood stain on filter paper (FTA card) was obtained from the raped girl, first and second defendants while bone fragments from fetus corpse were collected following grave exhumation.

DNA profile

15 autosomal STR and Amelogenin markers were investigated in DNA typing department. Extraction of DNA was made by chelex method for FTA cards and phenol – chloroform-isomyl alcohol method for the bone sample.

Human DNA quantification on ABI prism 7500 sequence detection system was performed using (Applied Biosystem) kit. Simultaneous amplification of 16 STR loci (D8S1179, D21S11, D7S820, CSF1PO, D3S1358, THO1, D13S317, D16S539, D2S1338, D19S433, VWA, TPOX, D18S51, D5S818, FGA and AMELOGENIN) was done by using the AmpFLSTR® Identifiler™ PCR amplification kit according to the manual recommendation on 9700 PCR instrument (Applied Biosystem) including the run positive and negative control. Capillary electrophoresis, run and detection of amplified product was conducted with ABI prism 3130xl Genetic analyzer (16 capillaries array system-Applied Biosystem) following manufacturer's protocol with positive, Negative control and allelic ladder with the run. Data collection was performed with data collection V.3.0 software (Applied Biosystem). Samples were analyzed by Genemapper® V.3.2 software (Applied Biosystem) (8).

RESULTS AND DISCUSSION

General and Morphological examination revealed clear signs of birth occurs more than one year. The results of DNA profile for the raped girl, her father and his cousin were illustrated in table(1) below.

Table(1):The results of DNA profile for persons involved in the case

Marker	fetus		Mother (Daughte)		Father (1 st Defendt)		Father& Cousin (2 nd Defendat)	
D8S1179	14	15	14	15	14	15	11	15
D21S11	29	32.2	29	32.2	32.2	32.2	32.2	32.2
<u>D7S820</u>	<u>7</u>	<u>7</u>	7	13	7	9	10	10
<u>CSF1PO</u>	<u>10</u>	<u>10</u>	10	10	10	12	10	12
D3S1358	17	18	16	18	17	18	15	17
THO1	6	9.3	6	9.3	6	9.3	7	9.3
<u>D13S317</u>	<u>11</u>	<u>11</u>	11	12	8	11	12	12
<u>D16S539</u>	<u>13</u>	<u>13</u>	13	13	12	13	11	13
D2S1338	23	24	23	24	20	24	20	22
D19S433	13	15.2	13	15.2	13	13	12	13
<u>VWA</u>	<u>16</u>	<u>16</u>	14	16	16	18	16	18
<u>TPOX</u>	<u>8</u>	<u>8</u>	8	8	8	9	11	11
<u>D18S51</u>	<u>13</u>	<u>13</u>	13	13	13	14	13	14
<u>D5S818</u>	<u>11</u>	<u>11</u>	11	11	11	11	10	11
FGA	21	22	22	23	21	23	20	24

From above table, five Genetic markers (D7S820, D13S317, D2S1338, TPOX and FGA)exclude the 2nd defendant from being the biological father of dead fetus. In such case the exclusion would be absolute therefore no need for any further calculation.

To evaluate and present the evidence of match between the 1st defendant and dead fetus table(1) to the court, some calculations must be made.

In paternity, the likelihood ratio is the same as the paternity index(PI). Table(2) show the calculations of the frequencies for different possible combinations of genotypes and paternity index (PI) in this case.

Table(2):The frequencies of the possible combinations of genotypes and paternity index in this case

Marker	paternity alleles expected	Frequency of P	Frequency of q		PI
D8S1179	14 or 15 (p)	0.2225	0.1675	1/(p+q)	2.564102564
D21S11	32.2 (p)	0.1475	0.255	1/(p+q)	2.48447205
D7S820	7(p)	0.04		1/2P	12.5
CSFIPO	10 (p)	0.2975		1/2P	1.680672269
D3S1358	17 (p)	0.2375		1/2p	2.105263158
THO1	6 or 9.3 (p)	0.2875	0.1	1/(P+q)	2.580645161
D13S317	11 (p)	0.2875		1/2P	1.739130435
D16S539	13 (p)	0.1175		1/2P	4.255319149
D2S1338	24 (p)	0.0675	0.115	1/2(P+q)	2.739726027
D19S433	13 (p)	0.22	0.0775	1/(p+q)	3.361344538
VWA	16 (p)	0.2725		1/2P	1.834862385
TPOX	8 (p)	0.5325		1/2P	0.938967136
D18S51	13 (p)	0.17		1/2p	2.941176471
D5S818	11 (p)	0.2725		1/P	3.669724771
FGA	21 (p)	0.145		1/2P	3.448275862

The combined paternity index (CPI) was calculated by applying the product rule and multiplying PI from each locus(9).(CPI = 3,177,548.3).

Forensic laboratories generally interprets DNA evidence using likelihood ratios , comparing probabilities of the evidence under alternative propositions(10).

Probability of paternity (POP)is another way for presentation of the result more accessible than Likelihood ratio takes into consideration non genetics evidence (9), This formula tests the hypothesis that the alleged father is indeed the biological father of the child. A POP of 99% (0.999999685= 99.9999685%) reflects a 99% probability that the hypothesis is correct and a 1% probability that it is not.

Some may think that DNA testing in rape cases, especially in the case of incest, is not totally valid because the samples of semen, or other bodily fluids may be contaminated with the DNA of the victim, which would produce different results. In cases of incest, DNA could be so alike because of heredity that the results may be hard to distinguish between the victim and rapist. Though many people believe this to be true, in all actuality "each person's DNA typing pattern is different and virtually unique."(Genetic DNA Typing)(11). In Iraq, we have seen many judges and detectives feel worry and being so conscious about whether the son-father match in DNA Profile was related to kinship hereditary similarities (as a grandfather) rather than due to the cause of being real biological true father.

Of course, here there are many points which must be put in mind, 1st is the circumstances, conditions and history of the case for example those cases are usually come from low socio-economic class, Broken home when the mother is usually out of the house for long period of time due to social troubles with the husband, also in most of those cases the daughter is in teen age year old when she cannot defend herself from her father abuse whose often threatened her frequently and may catch her in home as a jail (12). 2nd whether if there was one or 2 defendants or many partners or suspects. Of course, it will be much easier if the father is the only defendant in the crime than many, otherwise one should exclude all suspects before accuse the father. 3rd In general in Iraq one of the sequel of illegal pregnancy is to kill the daughter or the perpetrator (kill for honor) therefore it is unlikely for the father to behave in silent way without seeking for the partner. Usually those bad fathers suffer from variable psychological disorders and being strong tried to hide their crime and their daughter all over the time of her pregnancy press on and teach her to convict any one else. however always the daughter hates those kind of fathers and finally accused them. However although all points mentioned above are present in the history of this case with all morphological sign of previous pregnancy at daughter's body but scientifically the final word is usually related to the paternity investigations (blood never lies). DNA Typing reveals the close match of all 15 loci at the fetus with that of the alleged father and his daughter. CPI or Likelihood ratio was calculated to measure the strength or weight of the genetic evidence. In the court one may present and evaluate this figure as follows ((The result of DNA Testing are 3.177.548.3 i.e about 3 million times more likely if the tested man (1st defendant) is the biological father of the fetus than if the biological father is another man ,unrelated to the tested man in population) The fact that parentage has been discounted in 99 men in 100 is a more positive identification of the father where there are limited possibilities than were the father potentially any individual in the general population such as occurs with rape. In that case a probability of 99.9% or higher would be more definite, together with additional proof of the likelihood of the suspect being in the vicinity (13). The probability of paternity in this case show 99.9999685% , that is mean the raped girl's father was the alleged father for her fetus in 99.9999685 % than any other un related man was the father. Moreover, we have found that there are 8 homogenous loci in the DNA profile of the fetus. those are under lined in table (1) (D7S820,CSF1PO, D13S317,D16S539,VWX,TPOX,D18S51,D5S818) indicates high kinship relationship and sharing hereditary between his father and mother. The present study is compatible with many studies and reported incest cases in many countries in the world (14,15,16). DNA Typing in this case was the witness on perpetrator who buried the fetus trying to hide his crime, convicted another innocent man , and made many abuses against his daughter's rights, her femineity, her innocent childhood, leaving the pain and shame (16). According to our duty , we put this evidences between the hand of judge to judging him with death or jailing whole his miserable life (according to Iraqi 's law).

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REFERENCES

- 1- Fridell, L. (1990). Decision-making of the District Attorney: Diverting or Prosecuting Intrafamilial Child Sexual Abuse Offenders. *Criminal Justice Policy Review.*, vol.(4).
- 2- Lévi-Strauss, C.(tr. 1971). Elementary Structures Of Kinship.
- 3- Goldman, R. and Goldman, J. (1988). The prevalence and nature of child sexual abuse in Australia. *Australian Journal of Sex, Marriage and Family.*, 9(2): 94-106.
- 4- Herman, J. L. (1981). Father-Daughter Incest. Cambridge, Massachusetts: Harvard University Press. pp.282. ISBN 0-674-29506-4
- 5- Wiehe, V. R. (1997). Sibling Abuse: Hidden Physical, Emotional, and Sexual Trauma. Sage Publications, ISBN 0-7619-1009-3.
- 6- Kluft Richard P. (1990). Incest-Related Syndromes of Adult Psychopathology. American Psychiatric Pub, Inc., 83-89.
- 7- Trepper, Terry S. and Mary Jo Barrett. (1989). Systemic Treatment of Incest: A Therapeutic Handbook. Psychology Press.
- 8- User's Manual. (2001). AmpFlSTR® Identifiler™ PCR Amplification Kit, Applied Biosystem, USA.
- 9- Goodwin, W.; Linacre A. and Hadi S.(2007) An introduction to Forensic Genetics. John Wiley and Sons Ltd, England.
- 10- Butler, J. M. (2005). Forensic DNA typing Biology, Technology and Genetics of STR markers. 2nd edition. Elsevier (USA).
- 11- WowEssays.com - Dna.
- 12- الكاتب النور (2009). ناشطات نسويات يطالبن بإيجاد حلول لظاهرة زنا المحارم. شؤون سياسية. المصدر: <http://www.almalafpress.net/index.php?d=143id83243> النور الصادرة من الملف برس
- 13- [http://www.articlesbase.com/relationships-articles/dna-paternity-testing-of-related-potential-fathers.](http://www.articlesbase.com/relationships-articles/dna-paternity-testing-of-related-potential-fathers)
- 14- Brenner C. H (1996) Symbolic Kinship Program. *The Genetics Society of America.* Communicating editor: B. WEIR.
- 15- RAINN. (2000). Fighting sexual violence with DNA. (*Rape, abuse and Incest National Network.* <http://www.rainn.org>).
- 16- Chung, A. (2010). Man Fathered 10 children with daughter. *Sky News Online.* News.sky.com/home/world.