Dedication

To whom may God bless me because of her .....

My Mother.

To The man above all men, Dr.Abbas Ibrahim.....

My Father.

To My shelters through rainy days .....

My Sisters and Brothers in law.

To The greatest friend ever, to my guardian angle... ***Reemona.***

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Abstract

Fifteen patients were referred with provisional diagnosis of intersex from hospitals or private clinics of different geographical regions in Sudan to the Department of Clinical Genetics at the Radiation and Isotopes Center, Al Neelain Medical Research Center, and Elite Clinic for cytogenetic and/or molecular diagnosis. Of the 15 patients, 11 of them (73.3%) were raised as females, while 4 of them (26.7%) were raised as males; those patients were diagnosed by The Sudanese Intersex Working Group according to the medical history, physical examination, ultrasound, hormonal analysis, cytogenetic, and molecular studies.

The aim of this study was to determine the value of molecular analysis using SRY and Amelogenin genes in sex determination among patients with sex differentiation disorders by detection of presence or absence of SRY gene (sex determining region on Y chromosome) and findings of amelogenin gene (amelogenin gene found in both X and Y chromosomes with different molecular weights) in association with karyotyping.

Venous blood samples were taken from every patient to detect the presence or absence of SRY gene and the amelogenin gene findings compared with the karyotyping of all patients. .

DNA extraction was done and then PCR (polymerase chain reaction) was held to detect the presence or absence of SRY gene and amelogenin gene findings (either indicate XX or XY chromosomes).

The results of this study showed that 12 patients (80%) found to have XY karyotype, SRY positive and amelogenin findings showing XY pattern. One

patient (6.7%) had XY chromosomes, SRY present, and amelogenin findings showing XX. Another patient (6.7%) resulted in XX chromosomes, SRY present, and amelogenin findings indicated presence of XY chromosomes. The last patient (6.7%) had a mosaic karyotype (XX/XY), SRY positive and the amelogenin findings showed XY pattern.

These results indicated that the sex determination can never be based on the detection of amelogenin gene alone, but rather on the karyotyping and SRY gene, because the amelogenin gene never tells about mosaic conditions and SRY gene translocation, while karyotyping and SRY gene do.

الخلاصة

شملت هذه الدراسة 15 حالة تنميط نوعى لمرضى من مناطق مختلفة من السودان ، 11 منهم (73.3%) نشأوا كإناث بينما 4 منهم (26.7%) نشأوا كذكور ؛ و تم تشخيصهم بواسطةالمجموعة السودانية للتنميط النوعي .

تهدف هذه الدراسة إلى تحديد قيمة التحليل الجزيئي في تحديد نوع الجنس لمرضى التنميط النوعي عن طريق الكشف عن وجود أو عدم وجود مورث ال SRY (الذي يوجد طبيعياً عند الذكور في الكروموسوم Y) و نواتج مورث الأميلوجينين) مورث الأميلوجينين موجود في الكروموسوم Y والكروموسوم X بأوزان جزيئية مختلفة) بالمقارنة مع الفحص الجزئي والصبغي للكروموسومات (حيث XX تمثل كروموسومات الإناث بينما XY تمثل كروموسومات الذكور).

تم أخذ عينات دم وريدية من كل المرضى وتم إستخلاص الحمض النووي منها للكشف عن وجود مورث SRY و نواتج مورث الأميلوجينين بالمقارنة مع الفحص الجزئي و الصبغي للكروموسومات.

أظهرت نتائج هذه الدراسة ان : 12 من المرضى (80%) كانت لديهم نتائج الفحص الجزئي و الصبغي للكروموسومات متطابقة مع نواتج مورث الأميلوجينين حيث كانت XY ، مع وجود مورث SRY لديهم جميعاً. ؛ و 1 من المرضى (6.7%) كانت نتيجة الفحص الجزئي و الصبغي للكروموسومات له XY و نواتج مورث الأميلوجينين XX مع وجود مورث SRY . ؛ و 1 من المرضى (6.7%) كانت نتيجة الفحص الجزئي و الصبغي للكروموسومات له XX و نواتج مورث الأميلوجينين XY مع وجود مورث SRY .؛ وأنه عند الأخير من المرضى(6.7%) كانت نتيجة الفحص الصبغي الجزئي XY/XX بينما نواتج مورث الأميلوجينين كانت XY مع وجود مورث SRY .

أثبتت النتائج انه لا يمكن الاعتماد على كشف نواتج مورث الاميلوجنين لتحديد نوع الجنس عند مرضى التنميط النوعي بل الافضل الاعتماد على مورث SRY و الفحص الصبغي و الجزئي للكروموسومات.

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ACTH	Adrenocorticotrophic hormone
AIS	Androgen insensitivity syndrome
AMELX	The amelogenin X chromosome gene
AMELY	The amelogenin Y chromosome gene
AMH	Antimullerian hormone
CAH	Congenital adrenal hyperplasia
CAIS	Complete androgen insensitivity syndrome
DAX-1	Dosage sensitive sex reversal adrenal hyperplasia Congenita Gene on X chromosome
DHT	Dihydrotestosterone
ECM	Extracellular matrix
hCG	human Chorionic Gonadotropin
HMG	High mobility group
ISCN	International System for Chromosomal Nomenclature
LH	Luteinizing hormone
MIS	Mullerianinhibiting substances
PAIS	Partial Androgen insensitivity syndrome
PARS	Pseudoautosomal regions
PCR	Polymerase chain reaction
RNase	Ribonuclease
RT	Reverse transcription
SF1	Steriodogenic factor
SOX	SRY- related HMG box genes
SRY	Sex determining region of the Y chromosome
TDF	Testis determining factor
WT1	Williams tumor suppressor gene