Study of Anemia Risk of Children in Wasit Governorate /Iraq

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Abstract: — Anemia is one of the most common diseases that children suffer from in the world and in Iraq in particular, are the blood disorders characterized by reduction in the number of circulating red blood cell, the amount of hemoglobin or the volume of packed red cells in blood. Chromosomal aberrations have often been reported from the bone marrow as well as cultured lymphocyte of anemia patients. The aim of study finds out the chromosomal changes of anemia patients involved in the disorder, then to study the chromosomal analysis for patients. The distribution of anemia patients according to the gender did not show any significant differences between male and female patients. The results showed that there is family history of anemia Cytogenetic analyses, specifically chromosomal analysis , were carried out on all samples

Background and Objectives: studying types of anemia and chromosomal change in children age (3month-12 years) in the city of Kut and diagnosing those abnormalities.

Methods: The types of anemia to were studied using complete blood count (CBC) analytics caused by having anemia and the chromosomes of anemia patients to were analyzed and studied using cytogenetic analysis to detect chromosomal aberrations caused by having anemia after collecting blood samples this study carried out Al-Karama Teaching Hospital as well as from the to the patients' clinics in Kut.

Results: Found diagnosis of anemia types as follow (39) iron deficiency ,(3) thalassemia minor,(3) infection anemia, (2) plastic anemia ,(1) megaloblastic, (1) bone morro failure, (1) myeloid leukemia samples total (50) of anemia, Chromosomal analysis of all subjects showed chromosomal aberrations, (structural and numerical)changes aberration absent (1-28)it was due to leukemia that was anemia(2 out 28) ,chromosomal-aberration deletion (1-28) addition in the short arm chromosomal and clumped metaphase of patient .

Conclusion: Chromosome abnormality (abnormal number, structural) it occur in this study, most Chromosome abnormality (abnormal number) when an individual loses a

chromosome from one pair than to chromosome (chromosome absent) in the anemia patients, and most common anemia type from of microcytic anemia is Iron deficiency caused by reduced dietary intake in patients children

Keywords: Anemia, Iron deficiency, chromosomal aberrations, chromosome deletion, chromosome absent

1-Introduction:

Anemia can also be defined as a decrease in the number of red blood cells per litter. Chromosomal abnormalities have frequently been documented coming from the bone marrow as well as the cultured lymphocytes of individuals who were diagnosed with anemia. It is a very diverse set of disorders that can be acquired or inherited. Iron deficiency anemia is the most common cause [1]

Awareness about anemia and its consequences for the health and development of women and children has increased in the past few decades. In 2012, the 65th World Health Assembly approved an action plan and global targets for maternal, infant, and child nutrition, with a commitment to halve anemia prevalence in women of reproductive age by 2025, from 2011 levels. As such, attention to nutritional interventions, such as the Scaling Up Nutrition initiative, has increased. Furthermore, emphasis has been placed on the reduction of risk factors that adversely affect women and children, for example in the UN Secretary-General's Every Woman Every Child initiative and the accompanying Global Strategy for Women's and Children's Health. To plan for these programmers and priorities interventions, information is needed about hemoglobin and anemia in women and children, and how they have changed over time. [2]

Globally, it is estimated that 273 million (approximately 42.6%) of children under five years are anemic, whilst 60.2% of children under five years in the African region are anemic [3]. Used sample collection blood of the patient’s children, carried out in the laboratories of university of Wasit our study. To date, there are few studies that can determined type of anemia common and provide an overview of the prevalence of chromosomal abnormalities and using cytogenetic analysis, to determine the type of chromosomal abnormalities either structural or numerical, in children in Iraq. Therefore, sought study to determine changes chromosomal. in this study aim determine changes chromosomal by cytogenetic analysis because of the danger chromosomal aberration on survival.

2-The objectives of this study: Studying chromosomal changes by examining the chromosomal by body means of G-band and micronuclei, and studying common types for anemia patients of children.

3-Blood samples for cytogenetic analysis

Peripheral venous blood samples were collected from all study participants between October (2021-2022). Blood samples (5 ml) were collected in heparinized tubes under aseptic conditions. The samples were cultured and evaluated for statical analysis.

4-Results:

During the period of study (20) control (group) and (50) patients children anemia was total (70) sample. Their ages range from (3months - 12 years). There were 21 male and 29 female 0f group patient's children, and (10) male, (10) female of control group. found in the study, no significant difference($p<0.05$) as shown in Table (3-1)

Table (3-1) classification of patients according to age and gender

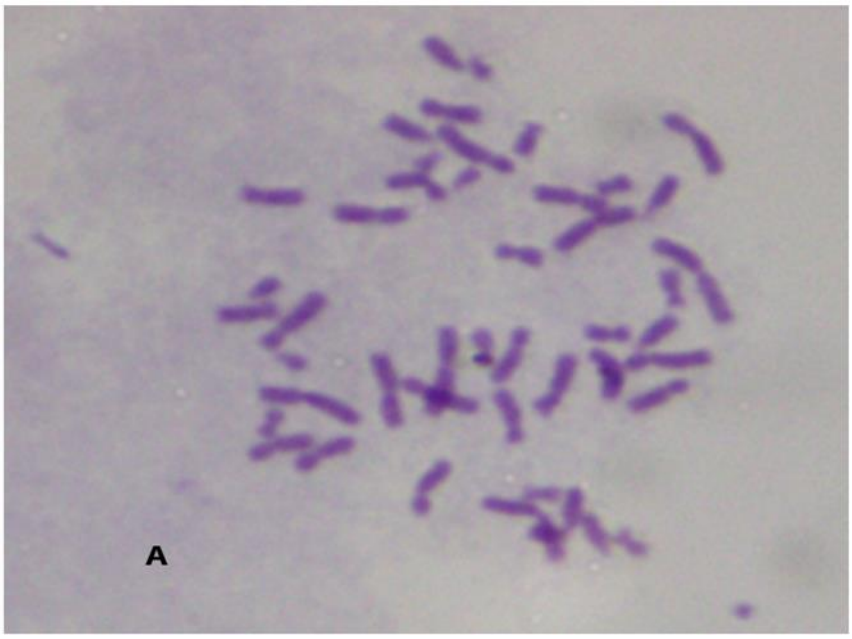
Age group	Gender				Total	
	Male		Female			
	N%		N%		N%	
3months-1 year	5	23.8	3	10.3	8	16
2 -5years	6	28.5	8	27.5	14	28
6-10 years	4	19	10	34.4	14	28
11 -12 years	6	28.5	8	27.5	14	28
Total	21	100	29	100	50	100
Chi-Square Tests	P-value		0.344			
Control (normal) (3-12 year)	10	50	10	50	20	
Total	31		39		70	

of the 50 cases in the present study, the hemoglobin levels ranged from (HB < 11 g/dl), the age group ranged between (3month-12years)

(39 out 50) samples were Iron deficiency that common of all type's anemia in children

Chromosome deletion: chromosomal aberration of male with anemia case No. (32) shows under microscope(1000X) during metaphase and present karyotype in the chromosomal 46, XY, del (17)(p) as fig. (3-2)

Chromosome absence: during Study found Chromosomal aberration of male with anemia case No. (43) under microscope (1000 X) showed absence chromosomal 22, Of metaphase and present in the (XY 22) change of chromosome number in Karyotype 45 in XY, -22, as fig. (3-4) .and as shown in table (3-4).



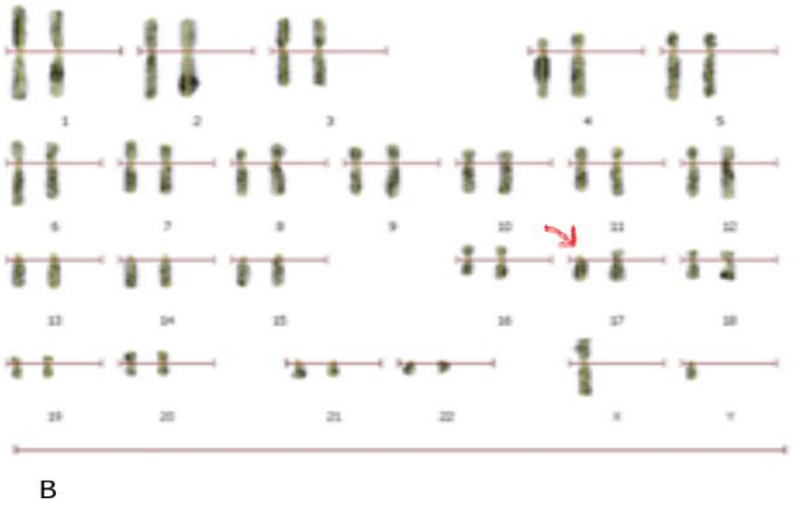
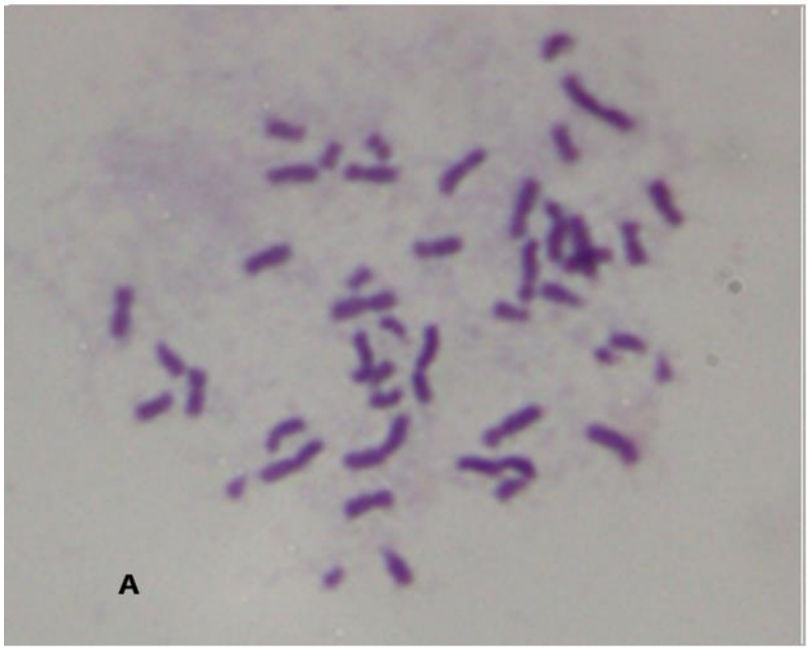
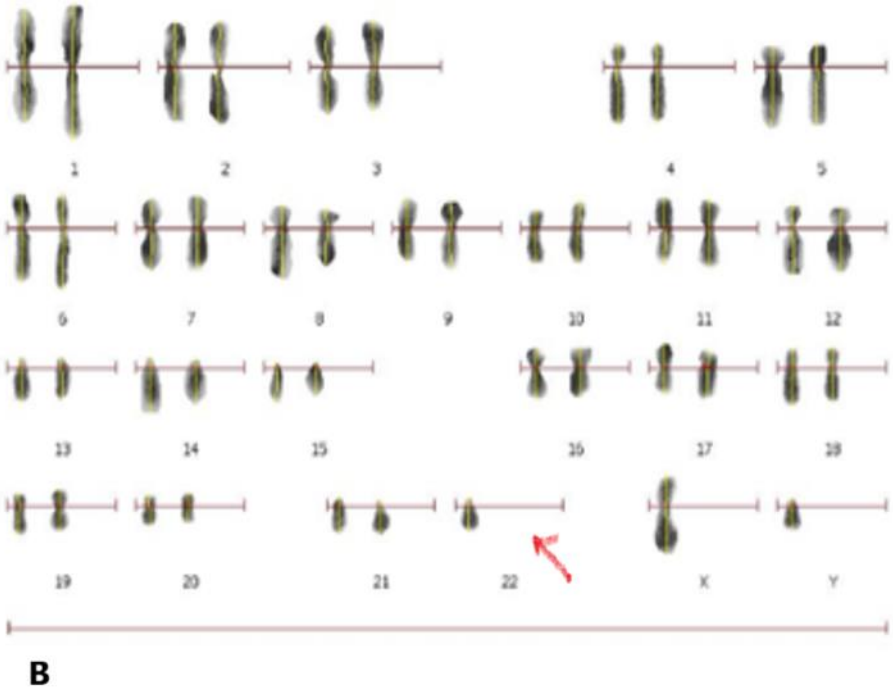


Fig. (3-2) Chromosomal aberration of male with anemia case No. (32) (1000 X)

A: Metaphase B: Karyotype 46, XY, del (17) (p





B

Fig. (3- 4) chromosomal aberration of male with anemia case No. (43) (1000 X) Metaphase:A, B: Karyotype 45, XY, -22

Table (3-4): chromosomal abnormality in patients with anemia

No. of Patient	Age year	Gender	Chromosomal aberration	Micronuclei	Family history
1	9	F	46, XX	Nil	None
2	4	F	46, XX gap (9), (10)	Presence	Father
8	6	M	46, XY	Nil	Mother
10	3	M	46, XY	Nil	None
11	9	M	46, XY	Nil	None
12	12	M	46, XY	Nil	None
13	12	M	46, XY	Nil	None
15	5	M	46, XY, dice (9)	Presence	Mother
17	11	F	46, XX	Presence	Mother
19	4	F	46, XX, dice (9)	Presence	Mother
21	12	M	46, XY,	Presence	Mother
23	12	F	46, XX	Nil	None
25	9	M	46, XY	Nil	None
27	11	M	46, XY	Nil	Mother
28	5	M	46, XY	Nil	None
30	9	F	46, XX	Nil	None
31	4	F	46, XX	Presence	None
32	9	M	46, XY, del (17), (p)	Presence	Father

34	**8**	**F**	**46, XX**	**Nil**	**None**
39	**11**	**M**	**46, XY**	**Nil**	**None**
43	**12**	**F**	**45, XX, -22**	**Presence**	**None**
44	**7**	**F**	**46, XX**	**Nil**	**None**
45	**6**	**F**	**46, XX**	**Nil**	**Mother**
46	**11**	**M**	**46, XY**	**Nil**	**None**
47	**3**	**F**	**46, XX**	**Presence**	**None**
48	**3**	**F**	**46, XX**	**Presence**	**None**
49	**5**	**F**	**46, XX**	**Nil**	**None**
50	**11**	**F**	**46, XX**	**Nil**	**None**

5-DISCUSSION

This study showed there were no significant difference($p<0.05$) as shown in Table (3-1). In this study Similar study in Karbala 2021 indicted findings revealed that there was no relation between the type of anemia and age or gender[4] . And study in Bagdad indicted, the statistical analysis showed no significant relation between age and prevalence of anemia and no significant relation was noticed between gender with anemia [5]. Study in Tanzania indicate that younger children(under 2 years) were more likely to be anemia compared to their older peers [6].Anemia is major source of morbidity and mortality worldwide [7]. Globally it is estimated that 273 million (approximately 42.6%) of children under five years are anemia whilst 60% of children are anemia in the African region are anemia [8].

This study was recoded the Iron deficiency that common of all types anemia in children, this result was similarity to study in Karbala /Iraq than revealed the most common type of anemia in Karbala was iron deficiency [13] (study in India indicate Iron deficiency anemia accounted for 80% in children [9]. Studies indicate in USA. should to treat iron deficiency of children with supplemental iron and early intervention because it causes later loss of cognitive function.[10]

Study in healthiness site indicate Iron deficiency anemia is the type that is most often linked to cancer.[11]. Study in Switzerland indicted (Iron deficiency (ID) often being a major and potentially treatable contributor. In turn, ID in cancer patients). [12]

Chromosome deletion, Chromosome absence in anemia patients. In this study we

Studies indicted chromosome abnormality are a missing , extra or abnormal portion of chromosomal DNA, leukemia and lymphoma, they could affect the amount of blood cells bone marrow makes Many things can cause anemia, including cancer).

.[16]

Structural chromosome changes can lead to birth defects, cancer, and other late onset disease outcomes.[17].

(Bone marrow findings in Fanconi anemia (FA) and discuss the clinical and biological implications of chromosomal aberrations associated with leukemic transformation [15]

Similar Studies in Kashmir2010 indicate. There have been reports of aneuploidy and loss of Y chromosome in case of sideroblastic anemias; trisomy's of 6 and 8 and loss of chromosome 7 in aplastic anemia.[1]

This study was similar indicate Numerical and morphologic chromosomal aberrations were demonstrated in three cases of pernicious anemia in relapse. The morphological abnormalities including chromatid breaks, gaps, "giant" chromosomes, translocation, dicentric chromosomes, acentric fragments, ring chromosomes, were reduced in remission following vitamin B_{12} therapy. The numerical changes consisted of aneuploidy (45 and 44 chromosomes) with the most common finding encountered (6 to 100 per cent of the cells) being monosomy involving the G 21 chromosome. And in that study, they found numerical changes consisted of aneuploidy (45 and 44 chromosomes). The numerical anomalies persisted in remission.[14]. Blood cancer is one type of cancer commonly linked to anemia. That's because blood cancer affects how your body produces and uses red blood cells [11]. So in this study revealed many influences contributing to anemia, and it has been found that not all but many of them are associated with chromosomal change.

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