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Assessment of EGFR /HER1 tumor marker in colorectal cancer among Sudanese patients

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Abstract:

***Introduction**; Colorectal cancer is the third most commonly diagnosed cancer in men and women in the world , and the third leading of cancer related death , up to 20% of patients with colorectal cancer will present with metastases, with 5-years survival less than 10% .Epidermal growth factor receptor (EGFR) named HER1 has been a widely studied molecule due to the key role it plays in colorectal cancer & development of many human tumors.*

***Method**: diagnosed patients with colorectal cancer grouped according to age for two groups (15 - 45) years old and (46 - 75) years old ,obtained from the department of pathology, at Khartoum state(Total lab care and Miliary hospital) during the period from January 2015 to January 2016 including 18 males & 32 females stained by immunohistochemistry , formalin fixed paraffin embedded*

blocks sectioned in five micrometer thickness followed by application of immunohistochemical procedure .

Conclusion: *EGFR show highly specific correlation to colorectal cancer (90%) with significant p.value of (0.05), it have no relationship with age (p.v 0.36). more studies should be applied to evaluate the use of EGFR as a therapeutic planning marker in control of colorectal cancer.*

Key words: Colorectal cancer, EGFR (HER1), immunohistochemistry

INTRODUCTION:

In the developed & developing countries all over the world Colorectal cancer is the third most commonly diagnosed cancer in men and women in the world, and the third leading of cancer related death (Ng K, et al. 2008), up to 20% of patients with colorectal cancer will present with metastases, with 5-year survival less than 10% (Ng et al. 2008). Supportive care alone provides a median survival of approximately 6 months for patients with metastatic colorectal cancer (Jackson et al. 2008) . In Sudan there is incomplete registration of cancer & the information available are inadequate enough for judging the situation, so we aim to explain the relationship between EGFR (Her1) tumor marker prognosis and diagnosis of colorectal cancer.

Epidermal growth factor receptor (EGFR) has been a widely studied molecule due to the key role in play in the development of many human tumors (PrenzelN ,2001).EGFR is a 170 Kd a membrane glycoprotein composed of three domains: a ligand-binding extracellular domain, a lipophilic transmembrane segment and a cytoplasmic domain with tyrosine kinase activity (Carpenter G.1987) EGFR, also known

as HER1 and ErbB, is one of the members of the ErbB receptor family.

2. MATERIALS AND METHODS:

2.1. Materials:

2.1.1. Subjects:

Diagnosed patients with colorectal cancer grouped according to age into two groups(15 - 45) years old and (46 - 75) years old ,obtained from the records of the department of pathology, at Khartoum state (Total Lab Care & Military Hospital-omdurman) during the period from January 2015 to January 2016.

2.1.2. Samples:

A total of 50 colorectal cancer specimens selected, including 18 males & 32 females Examination of multiple levels of H&E-stained sections and was confirmed by one pathologist.

2.2. Methods:

2.2.1. Immunohistochemical Analysis

Immunohistochemical staining was achieved using streptoavidin-biotin immunoperoxidasetechnique (thermo fisher,). Three to five micrometer thick sections, cut from formalin fixedparaffin embedded blocks, were deparaffinized in Xylene and rehydrated in graded alcohol (absolute – 90% -70%). The mounted sections were immersed in the retrieval solution, tris buffer EDTA (PH 9.0), then boiled in this solution in PT link for 20 min and then washed in phosphate buffer saline (pH 7.2).Then the slides were incubated 20 minute using a monoclonal anti EGFR antibody ready to use thermofisher), After a buffer rinse, bound antibodies were detected with the thermo Envision System. Slides were counterstained with

hematoxylin, and rinsed again. The slides were allowed to air dry and were cover slipped with permanent mounting media. Negative controls, in which the primary antibodies were replaced by PBS, were carried out for each primary antibody For EGFR , known colorectal cancer slides was used as positive internal control.

Immunohistochemical Evaluation:

- Results obtained from two sections were detected by the researchers and confirmed by experienced histopathologist.
- Negative and positive controls were used for evaluation of the test sections.

2.2.2. Statistical analysis

The results of the study were statistically analyzed using SPSS version16 statistical program. Data were expressed as mean± SD for quantitative variables, numbers and percentage. For categorical variables, student t test was used. For statistical analysis of Gleason's grading Spearman's statistical test was used. $P< 0.05$ was considered the significant limit.

3. RESULTS:-

45 samples which represent 90% of examined samples have been showed highly positive result reflecting the highly significant relationship between EGFR and colorectal carcinoma in Sudanese patients.(figure1).

3.1. Staining results with EGFR :

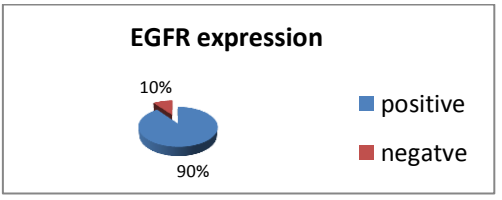

Figure1: positive & negative results of EGFR by IHC.

Correlation between EGFR expression and Age groups

Age groups	EGFR expression		Total
	Positive	Negative	
15-45	18	1	19
46-75	27	4	31
Total	45	5	50

P.value:0.362 (table1).

Correlation between EGFR expression and Sex

Sex	EGFR expression		Total
	Positive	Negative	
Male	14	4	18
Female	31	1	32
Total	45	5	50

P.value:0.050 (table2).

4. DISCUSSION:

EGFR expression has been associated with malignant transformation as well as worse clinical outcome in colorectal cancer(Yarom N, et al 2011),(Amit Mahipal, et al 2014)& used in diagnosis , therapy planning & sub typing for colorectal cancer & many other types of cancers (Ciardiello F, 2000),(Sandra Van Schaeybroeck, 2005).

In these studies we examined the expression of EGFR among Sudanese patients using of immunohistochemical method , we found that the results are compatible with other international studies ,

In our study we found that 45 samples which represent 90% of examined samples have been showed highly positive result reflecting the highly significant relationship between EGFR and colorectal carcinoma in Sudanese patients.(figure1).
In details total of 19 patients which represent 38% grouped in between (15 –45) years old, 18 positive (94.7%) where 1 negative (5.3%).(tabe1). Followed by 31 patients which represent 38% grouped in between (46 – 75) years old, 27

positive (87%) where 4 negative (13%).(table1).No significant correlation to age group (p.v 0.362).

In total of 18samples which represent 36% was male grouped 14 positive (77.8%) where negative (22.2%).(table2). Followed by 32 samples which represent 64% was female grouped 31 positive (96.9%) where negative (3.1%).(table2).

5. CONCLUSION:

EGFR show highly specific correlation to colorectal cancer (90%) with significant p. value of (0.05), it have no relationship with age (p.v 0.36). more studies should be applied to evaluate therapeutic planning of EGFR in control of colorectal cancer.

6. Acknowledgement:

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