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Original Research Article

Clinicopathological Study and Prognostic Utility of HER2/Neu Expression in Colorectal Carcinoma

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Abstract

Colorectal carcinoma is one of the most common cancers inspite of the improvement in treatment modalities, colorectal carcinoma remains as a leading cause of cancer mortality. In most of the individuals with colorectal carcinoma, cancer development is mainly due to complex interaction between the genetic factors and environmental factors Various prognostic factors have influenced the outcome of patient with colorectal carcinoma. In this study, immunohistochemical expression of Her2/neu marker is correlated to various clinicopathological variables like age, gender, tumor size, grade, stage of the tumor.

Keywords: HER2/Neu, Colorectal carcinoma, prognosis.

INTRODUCTION

Colorectal carcinoma is third most common cancer in women and the fourth most common in men. It contributes to 9.4% of all cancer cases, according to a 2008 report [1]. The second most prevalent cancer to cause death is colorectal cancer [2]. Each year, around one million new cases were diagnosed [1].

The countries with the greatest yearly incidence rates include Australia, New Zealand, North America, and Japan [2]. Developing nations including those in Africa, India, and various parts of South East Asia have low annual incidence rates [1]. The incidence in India is roughly 7/100000 [3, 4].

Colorectal cancer risk is influenced by both endogenous (constitutional) & exogenous (environmental) variables [1]. Colorectal cancer mostly affects elderly and late middle-aged people [1]. The most typical signs and symptoms of colorectal cancer patients include hematochezia, stomach pain, and changes in bowel habits [2].

The primary method of treatment for colorectal carcinomas is surgical resection. The requirement for adjuvant therapy is determined by additional disease staging using a resected specimen's pathological evaluation [1].

The chromosome 17q region contains the proto-oncogene HER2/neu. The transmembrane tyrosine kinase growth factor receptor activator is encoded by HER2/neu is crucial in regulating healthy cell growth, differentiation, and motility. In cancer cells, dysregulation of these pathways results in the overexpression of HER2/neu. As a result, it causes the proliferation and migration of tumour cells [5].

Patients with colorectal cancer who have HER2/neu overexpression may benefit from monoclonal antibody therapy, such as trastuzumab [5].

The low prevalence of HER2/neu amplifications in CRC, which makes it difficult to assess their potential prognostic significance.

Objectives: To correlate the Immunohistochemistry expression of Her2/neu in colorectal carcinoma by comparing with histopathological and prognostic factors.

MATERIALS AND METHODS

The present study is conducted in Department of pathology, Narayana medical college and general hospital, Nellore.

It is conducted for a period of 1year June 2021 to may 2022.

All the Specimens sent by surgical gastroenterology and General surgery departments with colorectal carcinoma specimens are included in the study

Specimens are sent to department of pathology for histopathological diagnosis.

Their gross features and histopathological sections are also taken and correlation, confirmation of the diagnosis is done.

Her2/neu immunohistochemistry is done and its expression is studied and prognosis of the patient is evaluated.

Statistical Analysis Method: Data analysis done by SPSS- VERSION 25.0 SOFTWARE. Qualitative data analysis is done by using chi-square test. Quantitative data analysis is done by using Z-test.

RESULTS

Table 1: Age Wise Distribution of Cases

Age In Years	Frequency	Percentage
30-50	22	40.0
51-70	26	47.3
71-90	7	12.7
Total	55	100.0

Out of 55 cases, 30-50 years were 22 (40%), 51-70 years were 26 (47.3%) & 71- 90 years were 7 (12.7%).

Table 2: Gender Distribution of Cases

GENDER	Frequency	Percentage
FEMALE	29	52.7
MALE	26	47.3
Total	55	100.0

Out of 55 cases the gender distribution in females were 29 (52.9%) whereas males were 26 (47.3%).

Table 3: Distribution of Size of the lesion

Size	Frequency	Percent
6 to 10 cm	11	20.0
Upto 5 cm	44	80.0
Total	55	100.0

Out of 55 carcinomas the dimensions (size) of 6 to 10 cm were 11 (20%), whereas up to 5 cm were 44 (80%).

Table 4: Distribution of Cases as Per Grade

Grade	Frequency	Percent
G 1	25	45.5
G 2	25	45.5
G 3	5	9.1
Total	55	100.0

Out of 55 cases, grade 1 were 25 (45.5%) grade 2 were 25 (45.5%) & in grade 3 were 5 (9.1%).

Table 5: Staging of Cases

Stage	Frequency	Percent
STAGE 1	42	76.4
STAGE 2	13	23.6
STAGE3	00	00
STAGE4	00	00
Total	55	100.0

Out of 55 cases, stage 1 were 42 (76.4%) & stage 2 were 13 (23.6%)

RESULTS OF IMMUNOHISTOCHEMISTRY: IMMUNOHISTOCHEMICAL EXPRESSION OF Her2/neu: The immunohistochemical expression of Her2/neu was evaluated by ASCO scoring and it was

scaled from 0 to 3+ score. For assessment of Her2/neu, score 0 and score 1+ are taken as negative, score 2+ taken as equivocal, score 3+ is taken as strong positive.

Table 6: Immunohistochemical Expression of Her2/neu

AGE	HER2/neu			Total
	1+ (%)	2+ (%)	3+ (%)	
30-50	10(45.5)	5 (22.7)	7 (31.8)	22 (100.0)
51-70	13 (50.0)	13 (50.0)	0 (0.0)	26 (100.0)
71-90	0 (0.0)	7 (100.0)	0 (0.0)	7 (100.0)
Total	23 (41.8)	25 (45.5)	7 (12.7)	55 (100.0)

Out of 55 cases, 1 + was 10 (45.5%), 2+ were 5 (22.7%), 3+ were 7 (31.8%), whereas in between 51-70 years 1+ were 13 (50.0%), 2+ were 13 (50.0%), 3+ were 0, & in between 71-90 years with 1+ were 0, 2+ were 7(100%), 3+ were 0 respectively.

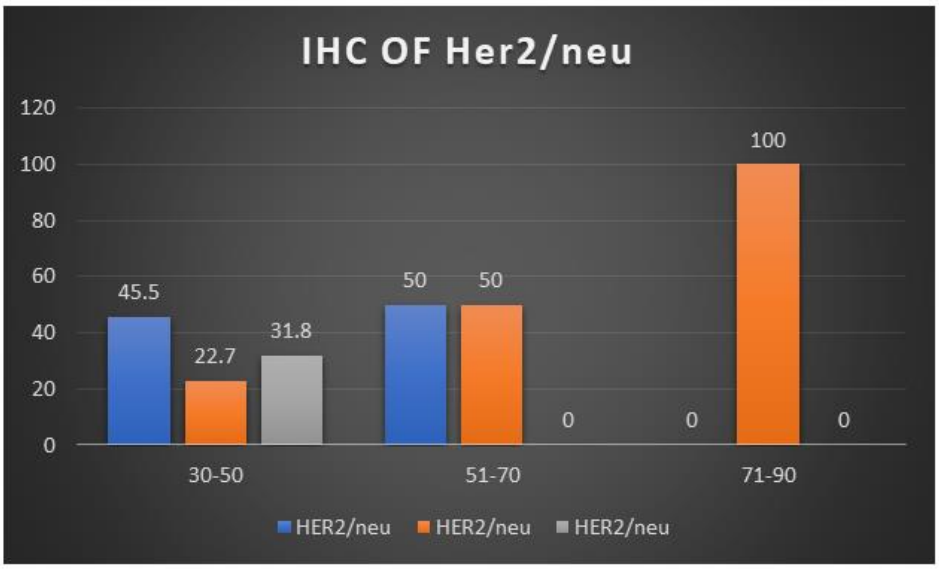


Figure 1: Immunohistochemical Expression of Her2/neu:

GROSS

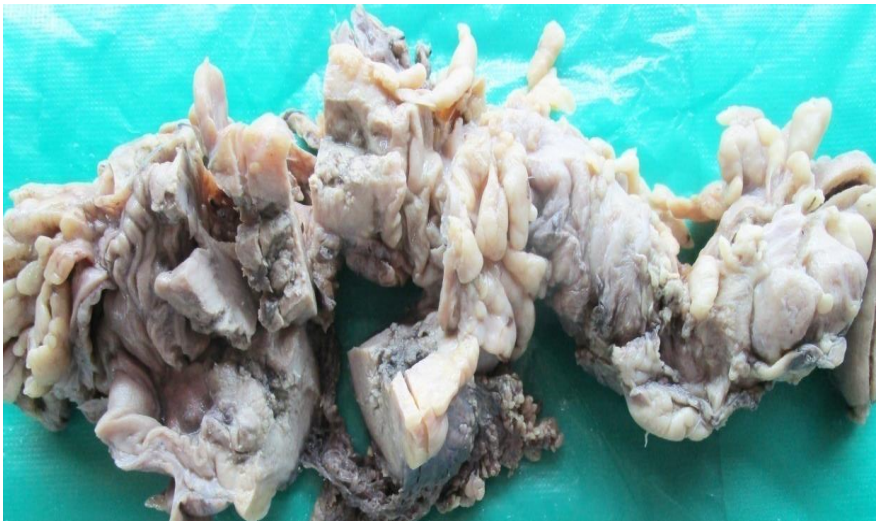


Fig 2: Ulceroproliferative growth in descending colon

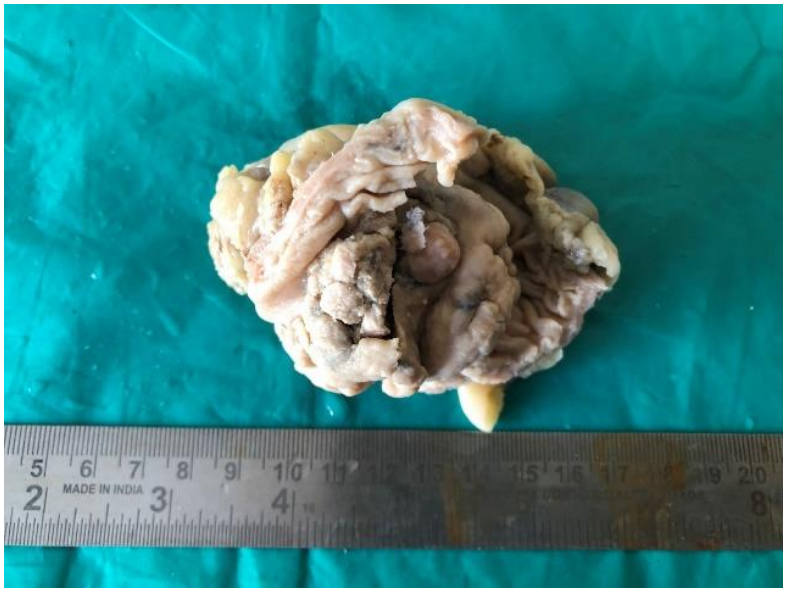
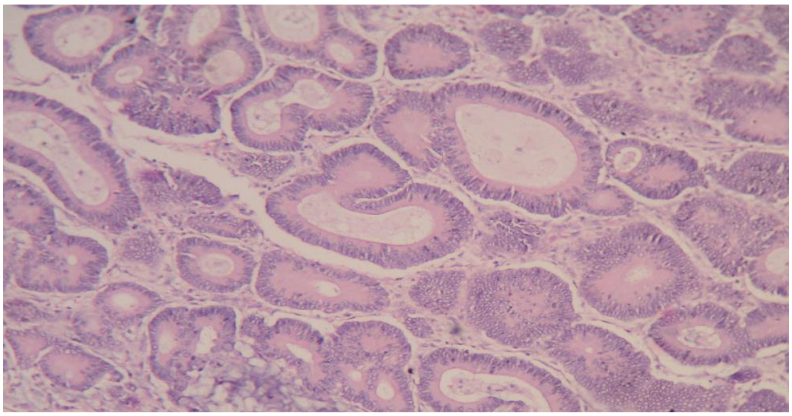
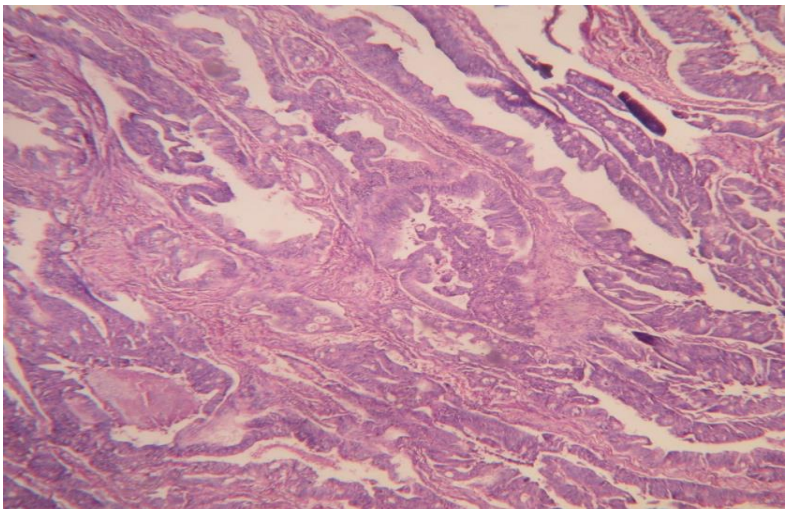


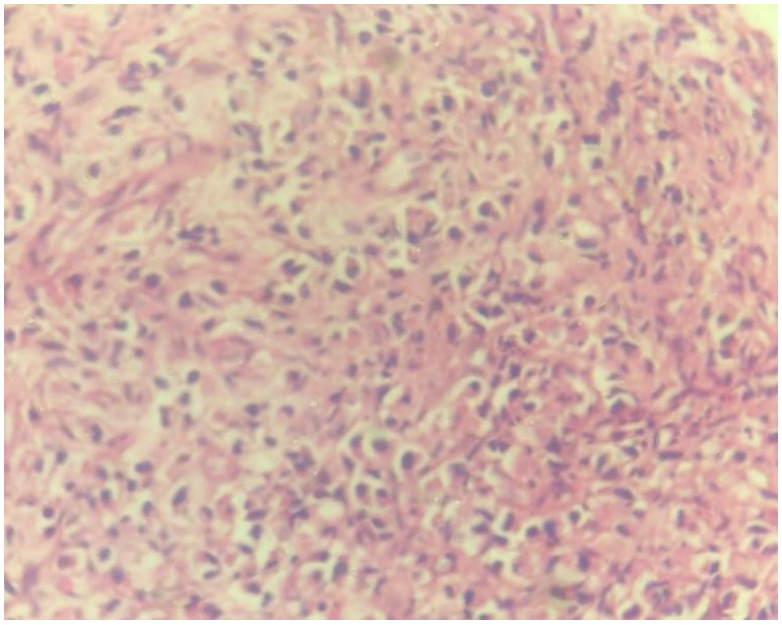
Fig 3: Ulceroproliferative growth in ascending colon



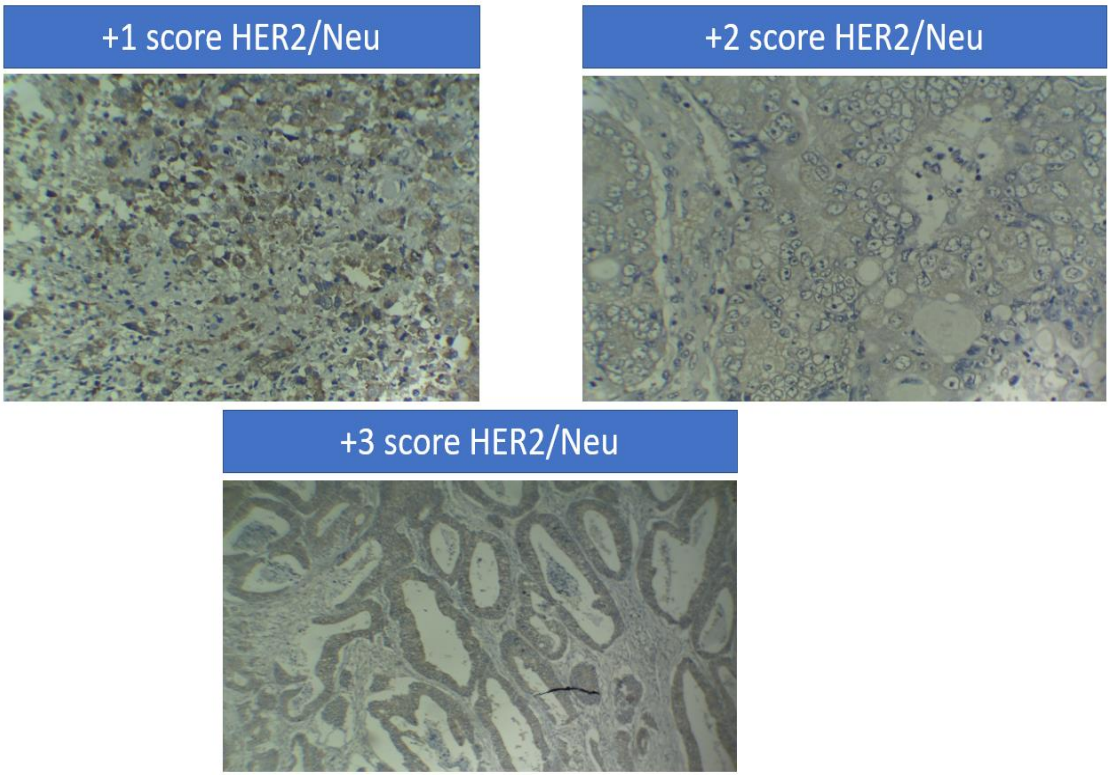
Grade 1: Well Differentiated Carcinoma (40X), H&E Stain



Grade 2: Moderately Differentiated Carcinoma (40X), H&E Stain



Grade 3: Poorly Differentiated Carcinoma (40X) H&E



DISCUSSION

A study conducted by Pappas *et al.*, (2011) on HER2/neu expression in 51 colorectal carcinomas using Immunohistochemical technique was done of which 3.9% of colorectal carcinoma cases showed HER2/neu overexpression.

In the pappas *et al.*, study (2011) most of the tumors are grade 3 (85.0%) and majority cases were in stage 3.

In the present study on comparing the immunohistochemical expression of Her2/Neu in 55 cases of colorectal carcinoma with various clinical and pathological variables.

46% are grade 1, 45% are grade2 and 9% are grade 3. 100% of cases showed Her2/Neu expression, most of the cases are in stage 1.

It is evident that there is significant statistical positive correlation between Her2/Neu expression with grade, size, gender, age & stage of tumor.

SUMMARY

In this study, immunohistochemical expression of Her2/neu marker is correlated to various clinicopathological variables like age, gender, tumor size, grade, stage of the tumor.

It has been observed that HER2/neu over expression in colorectal carcinoma gives good prognostic results, since over expression is seen in early stages of the tumor.

REFERENCES

1. Odze, R. D., & Goldblum, J. R. (2014). Surgical pathology of the GI tract, liver, biliary tract, and pancreas, 3rd edition. Elsevier Health Sciences, 737-778.
2. Alpers, D. H., Kalloo, A. N., Kaplowitz, N., Owyang, C., & Powell, D. W. (2011). Textbook of gastroenterology, 5th edition. John Wiley & Sons, 1369-1716.
3. Chaurasia, B. D. (2010). BD Chaurasia's Human Anatomy, 6th edition. CBS Publishers & Distributors PVt Ltd. 265-273.
4. Kumar, V., Abbas, A. K., & Aster, J. C. (2015). Robbins and Cotran Pathologic Basis of Disease, 9th edition. Elsevier Health Sciences, 777-814.
5. Pappas, A., Lagoudianakis, E., Seretis, C., Tsiambas, E., Koronakis, N., Toutouzas, K., ... & Manouras, A. (2013). Clinical role of HER-2/neu expression in colorectal cancer. *J Buon*, *18*(1), 98-104.
6. Achalla, L. S. V., Shinde, R. K., Jogdand, S., & Vodithala, S. (2022). Review of the Role of HER2/neu in Colorectal Carcinomas. *Cureus*, *14*(5).
7. Yano, Y., Konishi, K., Yamochi, T., Katagiri, A., Nozawa, H., Suzuki, H., ... & Imawari, M. (2011). Clinicopathological and molecular features of colorectal serrated neoplasias with different mucosal crypt patterns. *Official journal of the American College of Gastroenterology| ACG*, *106*(7), 1351-1358.
8. Sun, X., Zhao, D., Long, S., Chen, S., Cai, Q., & Yao, S. (2020). Clinicopathological and molecular features of colorectal cancer with synchronous adenoma. *Scandinavian Journal of Gastroenterology*, *55*(9), 1063-1071.
9. Anwar, S., Nagi, A. H., Naseem, N., Saqib, M., & Sami, W. (2010). Clinicopathological pattern and HER 2/neu status in patients presenting with different histological grades of colorectal carcinomas. *Basic and Applied Pathology*, *3*(1), 21-26.
10. Schuell, B., Gruenberger, T., Scheithauer, W., Zielinski, C., & Wrba, F. (2006). HER 2/neu protein expression in colorectal cancer. *BMC cancer*, *6*(1), 1-5.
11. Gill, M. K., Manjari, M., Jain, K., & Kaur, T. (2011). Expression of Her-2/neu in colon carcinoma and its correlation with the histological grades and the lymph nodes status. *JCDR*, *5*(8), 1564-1568.
12. Mármol, I., Sánchez-de-Diego, C., Pradilla Dieste, A., Cerrada, E., & Rodriguez Yoldi, M. J. (2017). Colorectal carcinoma: a general overview and future perspectives in colorectal cancer. *International journal of molecular sciences*, *18*(1), 197.
13. Hamilton, S. R., & Aaltonen, L. A. (2000). Pathology and genetics of tumours of the digestive system. *World*, 14.
14. Rosai, J. (2011). Rosai and Ackerman's Surgical Pathology, 10th edition. China: Elsevier; 752-75.
15. Compton, C. C. (2003). Colorectal carcinoma: diagnostic, prognostic, and molecular features. *Modern Pathology*, *16*(4), 376-388.
16. Koehler, A., Bataille, F., Schmid, C., Ruemmele, P., Waldeck, A., Blaszyk, H., ... & Dietmaier, W. (2004). Gene expression profiling of colorectal cancer and metastases divides tumours according to their clinicopathological stage. *The Journal of Pathology: A Journal of the Pathological Society of Great Britain and Ireland*, *204*(1), 65-74.
17. Burke, A. B., Shekitka, K. M., & Sobin, L. H. (1991). Small cell carcinomas of the large intestine. *American journal of clinical pathology*, *95*(3), 315-321.
18. Cooper, H. S. (2015). Intestinal neoplasms. Sternberg's diagnostic surgical pathology, 6th edition. Philadelphia: Lippincott Williams and Wilkins; 1505-1576.
19. Jessurun, J., Romero-Guadarrama, M., & Manivel, J. C. (1999). Medullary adenocarcinoma of the colon: clinicopathologic study of 11 cases. *Human pathology*, *30*(7), 843-848.
20. Gibbs, N. M. (1977). Undifferentiated carcinoma of the large intestine. *Histopathology*, *1*(1), 77-84.
21. Bernick, P. E., Klimstra, D. S., Shia, J., Minsky, B., Saltz, L., Shi, W., ... & Wong, W. D. (2004). Neuroendocrine carcinomas of the colon and rectum. *Diseases of the colon & rectum*, *47*, 163-169.
22. Cassoni, A. M. (1998). Book Review-TNM classification of malignant tumours. *Clinical Oncology*, 10(1), 61.
23. Greene, F. L. (2002). American Cancer Society. *AJCC cancer staging manual*, 6.