Clinical Audit

The Advent of Monoclonal Antibodies at Kauvery Hospital, Vadapalani, Chennai, Tamil Nadu, India

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Abstract

Background: The advent of monoclonal antibodies (mAbs) has made a remarkable shift in the treatment of various diseases from impossible to possible. The unique mechanism of action of monoclonal antibodies is their capacity to recruit the host immune system to combat diseases. This unique aspect, combined with many advantages like specificity, provision of rapid immunity, low incidence of ADR and no interaction with other drugs, makes them an ideal choice in the management of so called 'difficult to treat diseases'. As the utilization of mAbs continues to grow, understanding their utilization and actions is crucial for optimising treatment strategies, improving patient outcomes and ensuring cost effectiveness for patients.

This study aims to analyze the utilization of mAbs in a tertiary care hospital and hence contribute to the body of knowledge in this field.

Keywords: Monoclonal antibodies; mAbs; Autoimmune disease; Cancer

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1. Introduction

Antibodies are 'Y' shaped immunoglobulins that are produced from well differentiated B cells called Plasma cells. Monoclonal antibodies are specific and synthetic antibodies produced in the laboratory. Kohler and Milstein pioneered the production of mAbs through 'Hybridoma technology'. [6] Since then various methods have evolved that reduces the immunogenicity that was a major barrier to its use. Muromonab CD 3 was the first mAb approved by FDA for clinical use. [4] Since then new generation mAbs with improved efficacy, increased tolerability and less side effects have been introduced in the pharmaceutical market. These mAbs have the revolutionized the treatment paradigm of so called 'difficult to treat diseases". Therefore, the evaluation of their utilization makes us aware of their practical applications and the benefits from prescribing the mAbs for various indications. This provides newer and better options for physicians to treat several diseases and ensure optimal therapeutic outcomes.

1.1 Objective

The objective of the study was to evaluate the prescribing patterns of monoclonal antibodies for various indications.

2. Methodology

A retrospective analysis was done by extracting data from medical records of patients who were prescribed mAb from November 2024 – April 2025.

Demographic details of the patients, mAb used and the indication for which it was prescribed was collected. The obtained data is presented in percentages and represented using charts.

3. Results

The study found that majority of the patients (53%) belong to the age group of > 60 years and 21.9% were aged 50-60 years.

Table 1: Demographic details of study population (N=41)

Age	No. of Patients
1–10	0
11–20	0
21–30	0
31–40	3 (7%)
41–50	7 (17%)
51–60	9 (21.9%)
>60	22 (53%)

In the present study majority of the patients were males (63.4%) and females constituted (36.6%) of the study population.

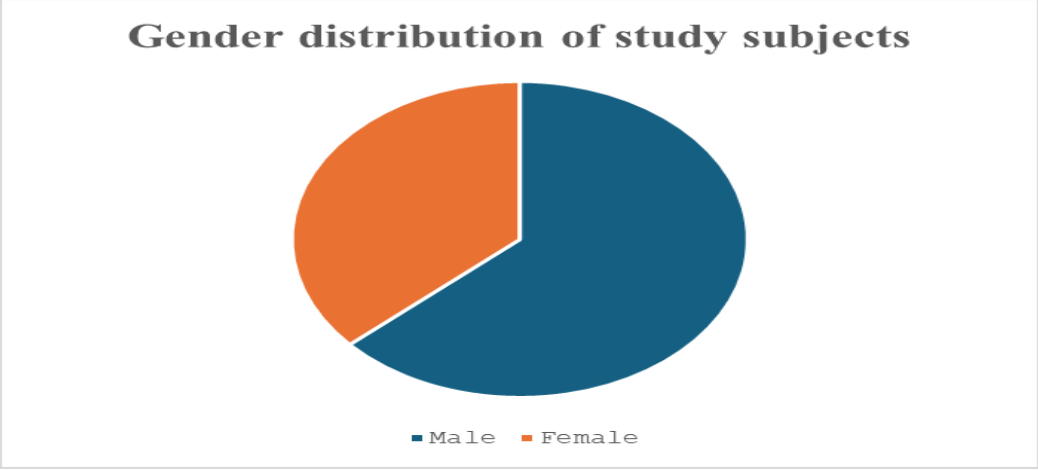

Fig (1): Gender distribution of study population

Table 2: Department wise demographics

Department	No. of Patients
Department of Orthopedics	2 (4.87%)
Department of Nephrology	3 (7.31%)
Department of Gastroenterology	1 (2.43%)
Department of Oncology	34 (82.9%)
Department of Neurology	1 (2.43%)

On the basis of the study findings, department of oncology used mAbs commonly. Of the total patients 82.9% received mAb for cancerous indications and for prophylaxis of associated complications. Trastuzumab, bevacizumab and rituximab were the most frequently used mAbs in the department of oncology.

Table 3: Distribution of disease in male and female patients

Diagnosis	No. of males	No. of females	mAb used
Prevention and treatment of SRE in patients diagnosed with cancer	9	2	Denosumab
Non-small cell lung cancer	2	0	Trastuzumab
Metastatic hepatocellular carcinoma	1	0	Bevacizumab +Atezolizumab
Metastatic adenocarcinoma of colon	0	1	Bevacizumab
Carcinoma breast	0	7	Trastuzumab, Pertuzumab
Gastric adenocarcinoma	3	0	Trastuzumab, Bevacizumab
Carcinoma ovary	0	2	Bevacizumab
Metastatic adnexal carcinoma	0	1	Bevacizumab
Non.Hodgkin's Lymphoma	4	1	Rituximab
Severe Osteoporosis	1	0	Denosumab
Renal Osteodystrophy	1	0	Denosumab
Hypercalcemia of malignancy	1	0	Denosumab
Ulcerative colitis	1	0	Adalimumab
Nephrotic syndrome	3	0	Rituximab
Remitting multiple sclerosis	0	1	Rituximab

The present study found that Denosumab was the most frequently used mAb. SRE was most frequently diagnosed in men compared to women. Combination of mAbs were used in the treatment of 'Metastatic Hepatocellular Carcinoma and CA Breast'.

4. Discussion

The results of the study show that mAbs are used frequently to treat various cancerous and non-cancerous conditions. The findings from the study reveal that majority of the patients (53%) belong to age group of >60 years and 21.9% were aged 51-60 years. Males were more in number than female patients, 63.4% and 36.6% respectively These findings are similar to a study which evaluated mAb utilization in a medical college in Kolkata. [2]

Denosumab was most widely used mAb according to our study. This could be because it was equally used both in cancerous and non-cancerous conditions. Department of oncology frequently used mAb. This was in contrary to a study evaluating "monoclonal antibody usage pattern in a tertiary care hospital by Shruthi Sridhar et al. [1] which reported frequent use of mAb was in the 'Department of ophthalmology'. The study also found that Denosumab was frequently used in the department of orthopedics. In our study Denosumab was commonly used as prophylaxis and treatment for "skeletal related events" in patients diagnosed with cancer. However, in the department of orthopedics Denosumab was used to treat 'Severe osteoporosis' in two patients in the present study.

Trastuzumab and Pertuzumab were the second most commonly used mAbs. Both the mAbs are humanized monoclonal antibodies approved for use in HER 2 + ve breast cancer. [7] The two mAbs were used in combination in adjunct to chemotherapy in treating majority of CA Breast patients. Patients who were refractory to treatment with Trastuzumab were treated using Pertuzumab in combination with small molecules like Lapatinib.

Rituximab was the third frequently used mAb. Rituximab is an anti-CD 20 mAb. It was used to treat lymphoma. It was also used in the Department of Nephrology in the management of nephrotic syndrome.

The usage of other mAbs were less. One of the reason could be the less number of patients presenting with the diagnosis for which the other mAbs are indicated.

5. Conclusion

The present study clearly demonstrates the evolving treatment strategies in the management of cancerous conditions and other diseases. The study reveals that monoclonal antibodies are used in the management of both cancerous and non-cancerous conditions, essentially not alone in auto immune diseases when considering non-cancerous conditions.

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