THE IMPORTANCE OF ANTIBIOTICS IN A VARIOUS UNIQUE METASTASIS ALONG WITH CYTOTOXIC THERAPY AT TERTIARY CARE HOSPITAL: A PROSPECTIVE COHORT STUDY

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OBJECTIVE: Rare cancers are creating a massive challenge to the world. It has associated with genetic mutations or socio-environmental factors, which includes genes, smoking, alcohol, ionizing radiation exposure, organic-inorganic chemicals, air and water pollution, viruses, and bacteria. When 15 cases per 1,00,000 people per year, we can consider it as a rare case as per the National Cancer Institute

This study aim is the importance of antibiotics in various unique metastasis along with cytotoxic therapy at tertiary care hospital.

Methods: The inclusion criteria of our study include a person who is suffering from rare metastasis at an early stage. We excluded the data that are those who are suffering from the typical type of cancers, multiple co-morbid conditions. This study was carried out the Prospective Cohort Study conducted between June 2018 to March 2020.

Results: Number of 20 rare cancers we consider for final analysis, the overall antibiotics use in this study 18 antibiotics they prescribed in overall cases, prescribed cytotoxic drugs are 23. the chi-square test value is P=0.001, the confidence interval(CI) is 95%, the likelihood ratio is 54.4, odd’s ratio is 2.0(CI 95%), P=0.711). Male patients more than the female patients.

Conclusion: Cancer is a complex disorder, which is occurred through gene proliferation and socio-environmental factors. Rare metastasis is challenging to physicians and patients, however as per our observation, cytotoxic therapy with antibiotics can reduce the risk of rare metastasis and as well improved therapeutic adhesion, and we need clear supporting evidence on it through clinical trials.

Keywords: Rare cancers, Cytotoxic therapy, Antibiotic utilization

INTRODUCTION

Cancers is a complicative disorder. Rare cancers are creating a massive challenge to the world [1], generally associated with genetic mutations or socio-environmental factors, which includes genes, smoking, alcohol, ionizing radiation exposure, organic-inorganic chemicals, air and water pollution, viruses, and bacteria [2]. Some organizations entrusted are there to provide comprehensive care to patients and improve the life expectancy of the survivors [3]. Each type of cancer has a specific biomarker observed in the body; for example, Burkitt’s lymphoma occurs due to over expression of an MYC-c [4]. The Cancer mortality rate in India has doubled from 1990 to 2016 [5]. India’s cancer incidence estimated that 1.1million new patients in 2018, and prognosticate to almost doubled up as a result of demographic transitions alone by 2040 [6]. Rare metastasis is a unique nature, which is a challenge to the physicians and their patients to diagnose their patients to prevent the disease. When 15 cases per 1,00,000 people per year, we can consider it as a rare case as per the National Cancer Institute [7].

Moreover, various cytotoxic therapies are available for different kinds of metastasis [8]. Often observed cytotoxic side effects such as nausea, vomiting, alopecia, gastrointestinal disturbances [9]. During the cytotoxic therapy, physicians prescribe antibiotics, antivirals [10], antifungal [11]. However, Physicians prescribe antibiotics based on the patient’s immune system, condition, severity, and etiological factors considered. Most of the Chemotherapy protocols are decreasing the white blood cells(WBC), which fight against microbiota [12]. If we are prescribing antibiotics continuously to a patient may get antibiotic resistance, which is the world’s biggest problem and WBC cells unable to fight against microbes [13]. It is profoundly impacting the therapeutic adhesion and as well typical to handle the infection condition if it may develop.

MATERIALS AND METHODS

Study design

This study was carried out the Prospective Cohort Study conducted between June 2018 to March 2020. At the Department of Oncology, Manipal super specialty hospital, Tadepalli, Vijayawada, Andhra Pradesh.

Data Collected from the oncology ward. We have received around 2000 different types of oncology cases that excluded the data that are those who are suffering from the typical type of cancers, multiple co-morbid conditions. The inclusion criteria of our study include a person who is suffering from rare metastasis at an early stage. We evaluated that cancer cases utilization of antibiotics, along with the treatment. We divided into two antibiotics exposure groups and non-exposure groups; we consider as group one is an antibiotic exposure group with rare cancers, and group 2 is a non-exposure group; it means non-antibiotics exposure.

Statistic considerations

We collected unique cancer cases, and the collected rare metastasis data extracted analysed from Statistical Package for The Social Sciences (SPSS-ver-26). The statistical approach of the study is Descriptive statistics, Chi-square test, correlation, ANOVA, odds ratio (OR).

RESULTS

The data shows that rare cancer cases are recorded (N=20), table 1 describes the gender distribution that represents male patients(N=14) are more than female patients (N=6). Most of the rare cancers are observed in male patients. The most common type of chief complaint is fever(3~15%); later on, abdominal pain (2~10%) in figure-1 we can be observed.
Table 1: Gender distribution

| Gender | Frequency | Percent |
|--------|-----------|---------|
| F      | 6         | 18.2    |
| M      | 14        | 42.4    |

Table 2 describes the descriptive statistics of each parameter we take. The mean and standard error mean (SEM) of each parameter as follows age 43.65±5.208 (N=20), Hemoglobin 9.5±0.56 (N=18), Creatinine 0.75±0.74(N=11), Total bilirubin 0.67±0.25(N=10), Direct bilirubin 0.33±0.139 (N=10), Indirect bilirubin 0.34±0.37, SGOT 41±15(N=10), SGPT 41±15(N=10), platelet count 203266±49218 (N=15), white blood cells 6607±1092(N=14) respectively.

Table 3a explains the prescribed cytotoxic drugs while in treatment most wildly used drug is vincristine(4~12.1%), Carboplatin (2~6.1%), cisplatin (2~6.1%), cytarabine(2~6.1%), Zoledronic acid(2~6.1%), Decitabine(1~3%), Decamethasone(1~3%), Doxorubicin(1~3%), etoposide(1~3%), Filgrastim(1~3%), ifosfamide(1~3%), Methotrexate(1~3%), octreotide acetate(1~3%), rituximab(1~3%).

Table 3a explains the prescribed antibiotic utilization while in the treatment mostly used antibiotics are Acyclovir (4~12.1%), meropenem (2~6.1%), sulfamethoxazole trimethoprim (2~6.1%), voriconazole(2~6.1%), Actinomycin (1~3.0%), Amikacin (1~3.0%), Fluconazole (1~3.0%), metronidazole (1~3.0%), polymyxin E(1~3.0%), tigecycline (1~3.0%), vancomycin(1~3.0%). The chi-square test value is119 (DF=12, P=0.001), the confidence interval (CI) is 95%, the likelihood ratio is 54.4, odd’s ratio is 2.0(CI 95%, P=0.711) (if odds ratio>1 that exposure is an only group one).

Fig. 1: The histogram describes gender. vs. age. vs. frequency of chief complaints

During the study period we observed very unique characteristics of each individuals, those are Pancreatic carcinoma(15%), Acute myeloid leukemia(15%), Burkitt’s lymphoma(10%), Wilms tumor(5%), Soft tissue sarcoma(5%), stomach cancer(5%), Hepatoblastoma (5%), Retinoblastoma (5%), Mediastinal tumor(5%), Relapsed multiple myeloma(5%), Medulloblastoma(5%), osteosarcoma(5%), ovary carcinoma(5%). The fig 2 describes the how many patients are suffering from different type unique metastasis.

Table 2: Descriptive statistics of each parameter

| Parameters      | N   | Mean   | Std. deviation | Variance | Skewness | F  |
|-----------------|-----|--------|----------------|----------|----------|----|
| Age             | 20  | 43.65  | 5.208          | 23.293   | 542.555  | -4.653 |
| Creatinine      | 11  | .7527  | .07470         | .05646   | .061     | 1.226  |
| Direct Bilirubin| 10  | .3340  | .13946         | .203266  | .194     | 2.896  |
| Hemoglobin      | 18  | 9.5722 | .56466         | 2.39480  | 5.735    | .360   |
| Indirect Bilirubin| 10 | .3340  | .11798         | .37310   | .139     | 2.254  |
| Platelet count  | 15  | 203266.6667 | 49218.49504 | 49218.49504 | 3633693809.524 | .816   |
| SGOT            | 10  | 41.4000| 15.90891       | 50.30838 | 2530.933 | 2.305  |
| SGPT            | 10  | 26.5000| 5.46555        | 17.28358 | 298.722  | 1.401  |
| Total Bilirubin | 10  | .6740  | .25213         | .79729   | .636     | 2.757  |
| WBC             | 14  | 6607.1429 | 1092.10273    | 1092.10273 | 4086.27426 | .251   |

Table 3b describes the antibiotic utilization while in the treatment mostly used antibiotics are Acyclovir (4~12.1%), meropenem (2~6.1%), sulfamethoxazole trimethoprim (2~6.1%), voriconazole(2~6.1%), Actinomycin (1~3.0%), Amikacin (1~3.0%), Fluconazole (1~3.0%), metronidazole (1~3.0%), polymyxin E(1~3.0%), tigecycline (1~3.0%), vancomycin(1~3.0%). The chi-square test value is119 (DF=12, P=0.001), the confidence interval (CI) is 95%, the likelihood ratio is 54.4, odd’s ratio is 2.0(CI 95%, P=0.711) (if odds ratio>1 that exposure is an only group one).
Table 3a: Chemotherapy prescribed drugs in various kind of unique carcinomas

| Name of the drugs     | Frequency | Percent |
|-----------------------|-----------|---------|
| Carboplatin           | 2         | 6.1     |
| Cisplatin             | 2         | 6.1     |
| cytarabine            | 2         | 6.1     |
| Decitabine            | 1         | 3.0     |
| Dexamethasone         | 1         | 3.0     |
| Doxorubicin           | 1         | 3.0     |
| Etoposide             | 1         | 3.0     |
| Folirinrix            | 1         | 3.0     |
| ifosfamide            | 2         | 3.0     |
| Methotrexate          | 1         | 3.0     |
| octreotide acetate    | 1         | 3.0     |
| Ritusimab             | 1         | 3.0     |
| vincristine           | 4         | 12.1    |
| Zoledronic acid       | 2         | 6.1     |

Table 3b: Antibiotic utilization in chemotherapy

| Name of the drugs            | Frequency | Percent |
|------------------------------|-----------|---------|
| Actinomycin                  | 1         | 3.0     |
| Acyclovir                    | 4         | 12.1    |
| Amikacin                     | 1         | 3.0     |
| Fluconazole                  | 1         | 3.0     |
| Meropenem                    | 2         | 6.1     |
| Metronidazole                | 1         | 3.0     |
| Piperacillin+Tazobactam      | 1         | 3.0     |
| polymyxin E                  | 1         | 3.0     |
| Sulfamethoxazole+Trimethoprim| 2         | 6.1     |
| Tigecycline                  | 1         | 3.0     |
| Vancomycin                   | 1         | 3.0     |
| Voriconazole                 | 2         | 6.1     |

As per the chi square value this study is extremely significant (P<0.001)

DISCUSSION

This study result shows that antibiotic utilization during ongoing cytotoxic treatment of rare metastasis. The antibiotics prescribed in the only particular specific conditions like pancreatic carcinoma, Burkitt’s lymphoma, Ewing’s sarcoma, Wilms tumour, Hepatoblastoma, Acute myeloid leukaemia. However, in pancreatic carcinoma, antibiotics are decreasing tumour proliferation by 50% studied in animal models [14]. Burkitt’s lymphoma occurs in three conditions like Epstein bar virus, sporadic and immunodeficiency associated diseases such as HIV condition, the use of antivirals in this condition EBV and HIV decrease the risk of secondary infection condition [15, 16]. In Ewings sarcoma, it often occurs in around the bones they prescribed RNA synthesis inhibitors [17]. Wilms tumour antibiotic usage is very less than comparing other types of carcinomas because of the immature form of cells developed when the baby was born [18]. Likewise, every metastasis having hidden challenges is furthermore investigation needs in clinical trials.

CONCLUSION

Cancer is a complex disorder, which is occurred through gene proliferation and socio-environmental factors. Rare metastasis is challenging to physicians and patients, however, cytotoxic therapy with antibiotics can reduce the risk of rare metastasis and as well improved therapeutic adhesion and we need clear supporting evidence on it through clinical trials.
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AUTHORS CONTRIBUTIONS
All the authors have contributed equally.

CONFLICT OF INTERESTS
Declare none

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