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Improving Rituximab Infusion Waiting Time for Lymphoma Patients (CD20 Positive) at Johns Hopkins Aramco Healthcare: A Clinical Practice Quality Improvement Initiative

Salam S Abou Ghaida[1], Issam O Abduljaber[1], Joshua W Sharp[1], Nafisah A Al-Faris[1] and Huda Al-Sayed Ahmed[2*]

[1]*Oncology Institute, Johns Hopkins Aramco Healthcare, Dhahran, Saudi Arabia*

[*2]*Quality and Patient Safety Department, Johns Hopkins Aramco Healthcare, Dhahran, Saudi Arabia.*

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ABSTRACT

Introduction: Rituximab is used to treat aggressive and indolent lymphomas and for other autoimmune diseases. Rituximab usually well endured, however, it is found to be associated with infusion-related reaction during the first dose mainly. The manufacturer recommendation is slow initial infusion rate over 3 to 4 h, which requires healthcare resources and leads to patient dissatisfaction. Researches proved safety of Rituximab administration over 90 min in subsequent infusions as long as the first infusion well tolerated with no reaction. Following this protocol results in more efficient utilization management and treatment practice and ultimately increase patient satisfaction. This quality improvement project aims to reduce the Rituximab "Infusion time" considering safety of rapid infusion.

Materials and methods: A total of 50 patients diagnosed with CD20 positive Lymphoma, who were planned to receive Rituximab, were started infusion over 90 min from the second treatment cycle and for the later doses once the initial infusion is tolerated well as per the standard protocol.

Results: Patient infusion time reduced by 50% with no reaction reported. Accordingly, increased patient satisfaction rate during the study period.

Conclusion: Rapid Rituximab infusion rate is safe and accountable for improving the efficiency that consequently increased patient fulfillment.

Keywords: Rituximab, Rapid infusion rate, Patient satisfaction, Efficiency

INTRODUCTION

The biological therapy "Rituximab" is a CD20 antigen targeting monoclonal chimeric immunoglobulin G1 that is commonly available treatment to manage B-cell lymphoproliferative disorders [1,2]. Typically, it is being used in conjunction with other chemotherapy regimens like (CHOP); Cyclophosphamide, Hydroxydaunorubicin, Oncovin and Prednisone, to treat aggressive as well as indolent lymphomas [2]. It has been proven to improve the disease free survival as well as overall survival in non-Hodgkin's lymphoma and chronic B-cell lymphocytic leukemia [3]. Recently it is utilized as a maintenance therapy single-agent used after response to induction therapy for follicular lymphomas [2] and for other autoimmune diseases like rheumatoid arthritis [4].

Rituximab is well endured, however, it is found to be associated with a risk of infusion-related toxicity, ranging from hypersensitivity reactions, in addition to cardiovascular/respiratory compromising and distress syndrome [1,2,4], to death within 24 h [3]. Notwithstanding, the incidence of infusion reactions found to reach 77-80%

Corresponding author: Huda Al-Sayed Ahmed, PhD, CHQO, Quality and Patient Safety Department, Johns Hopkins Aramco Healthcare, PO 31911, Dhahran, Saudi Arabia, Tel: 00966504803854; E-mail: huda.alsayedahmed@jhah.com

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with first infusion, then after it subsides with the subsequent infusion episodes [3], though the mechanism of such response is not well understood [2].

Ordinarily, the traditional manufacturer recommendation for Rituximab infusion is to be administered at slow initial rate over 3 to 4 h that requires an increase in utilized healthcare resources, decrease in available treatment slots and ultimately leads to patient's inconvenience due to lengthy treatment intervals [5]. Several research studies in a number of countries have been conducted to investigate the feasibility and safety of an expedited infusion over 60 min and 90 min with a constant or escalated rate [3,6,7]. Rituximab rapid infusion protocols has been found to be medically safe when administered during the subsequent infusions after the first dose been given in a standard routine manner provided it was well tolerated without any adverse toxicity reaction [1,3,5]. Nevertheless, a lately published study by Modelevsky et al. [8], confirmed it is medically safe for patients with primary central nervous system lymphoma (PCNSL). Thereafter, rapid Rituximab infusion following this converted pharmaceutical protocol is being used internationally [7,9]. Per se, such policy resulted in a better and efficient utilization management to healthcare resources [5]. Eventually, this will lead to reducing the outpatient clinic visits duration and thus the expectation of elevated patient and healthcare professional satisfaction [10,11].

MATERIALS AND METHODS

This study was conducted in an outpatient oncology institute at Johns Hopkins Aramco Healthcare (JHAH); a large tertiary hospital located in the Kingdom of Saudi Arabia. An ethical approval was obtained from the Institutional Review Board at JHAH to publish the data and results of this project. Considering this project as a lean 6 sigma project, we followed DMAIC methodology to accomplish our main goal (DMAIC is designed to: Determine the problem, Measure the baseline, Analyze the current situation, Implement the intervention and Check/control the improvement).

Defining the problem

At the Oncology Institute of Johns Hopkins Aramco Healthcare (JHAH), the Lymphoma patients who are (CD20 Positive) receive the Rituximab treatment dose in an average of 3 hours which is a long infusion time that has been highlighted to lead to patient dissatisfaction.

Measuring the baseline and analyzing the situation

Data was collected to calculate the baseline for patients waiting time during Rituximab infusion process, in order to measure the performance of the existing clinical practice. The analysis revealed that patients wait for 186 min (3 h) to complete their chemotherapy infusion and be ready to discharge.

Implementation of action plan

An action plan was developed based on a comprehensive literature review. Previous clinical practice at JHAH-oncology indicated that the Rituximab infusion rate given for the initial infusion was (50 mg/h × 30 min). Efforts of evidence based practice (EBP) proved that it is safe to increase the first Rituximab infusion dose rate by 50 mg/h. q30 min, if "No adverse reaction". Then after, subsequent infusions rate was increased to (100 mg/h × 30 min) with Max rate of 400 mg/h. The action plan was applied starting from June 2018. A Rituximab rapid infusion executed over 90 min from the second treatment cycle. If the initial infusion tolerated well, a 20% of the dose will be administered over 30 min. Then after, the remaining 80% is given over 60 min and the same rate will be used for subsequent doses if tolerated.

Checking/controlling the improvement

Post implementation of action plan data was collected on November to check improvement status in the service as well as on Lymphoma patient's satisfaction.

RESULTS AND DISCUSSION

Rituximab infusion key performance indicator (KPI)

The average patients waiting time to Complete Rituximab Infusion was used as a KPI for the service. According to collected data, analysis revealed a significant reduction ($P \leq 0.001$) in Rituximab infusion time from 186 min to a mean time of 93 min (95% CI of 91-95) with 50% improvement and time saving **(Figure 1)**.

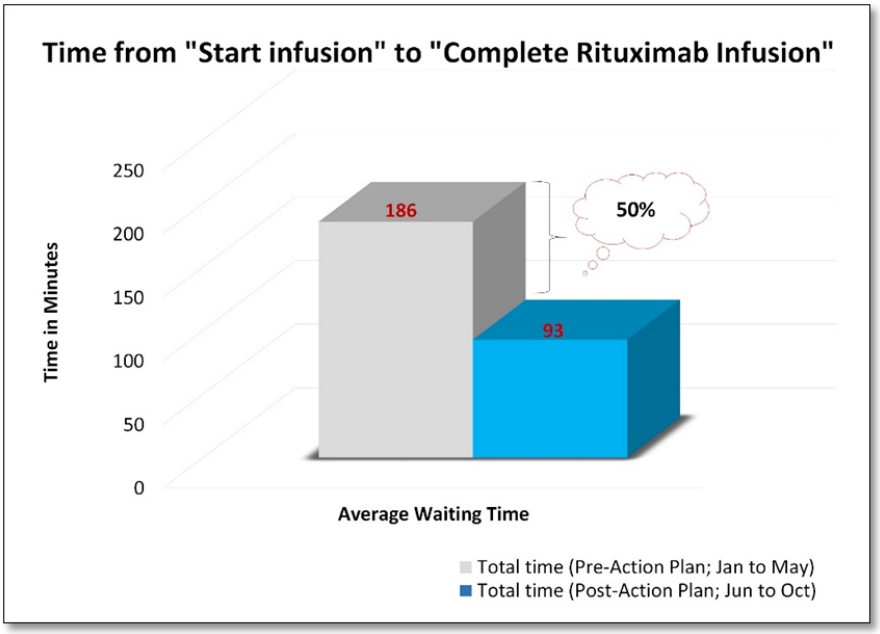

Figure 1. Bar graph displays the significant reduction (50%) in Rituximab infusion waiting time after applying the new timing protocol.

Oncology patient's satisfaction rate

The achieved improvement has sequentially reflected on the patient's "waiting time at oncology clinic" satisfaction rate. It was at 78% (during January to May; pre-implementation of action plan) and enhanced to 85% (during June to October; post-implementation of action plan) with around 7% improvement. The satisfaction rate was significantly affected by the implemented change in Rituximab infusion protocol, as indicated by patient's comments collected through the "Press Ganey" survey that is conducted on monthly basis. Moreover, personal interview with oncology patients who received Rituximab treatment took place to ensure the level of satisfaction before and after the action plan implementation **(Figure 2)**.

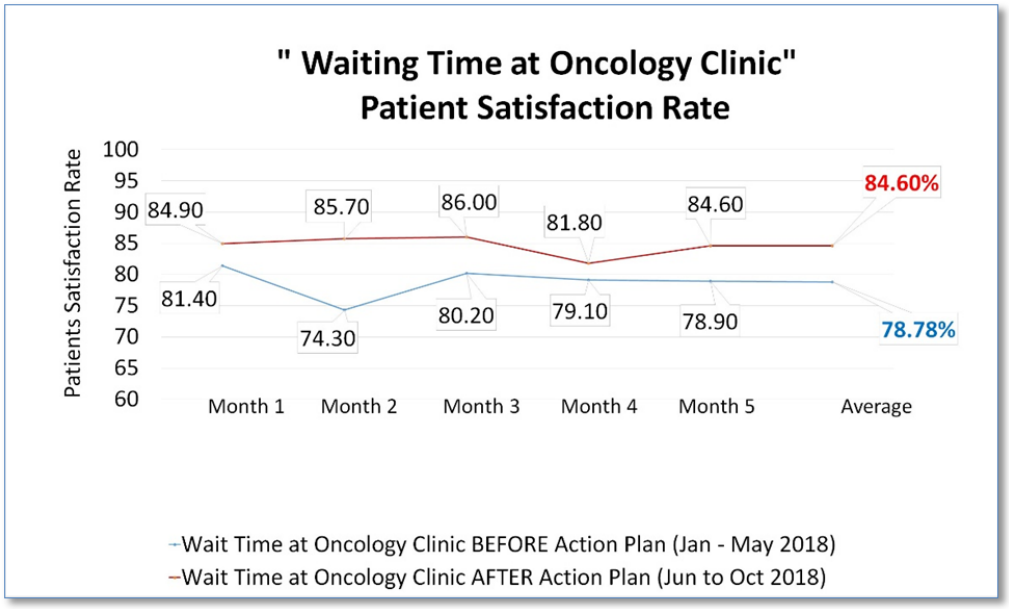

Figure 2. Run chart shows an improvement in oncology patient's satisfaction rate comparing pre and post action plan average rates.

CONCLUSION

In conclusion, a rapid Rituximab infusion protocol has demonstrated a safe clinical practice when administered within 90 min during the subsequent doses, with 0% of reaction compared to 10% of the historical data before implementing the rapid infusion practice. Not only has this reduced patient treatment times, conversely, this application has led to sufficient use of the treatment rooms at JHAH oncology institute which increased the number of served patients during the day. Nevertheless, this has improved patient satisfaction and the outpatient Oncology Institute's access to care results.

However, our next quality initiative is to introduce the Rituximab subcutaneous injection as a simpler, faster and cost-effective option. This will further reduce the burden on patients and healthcare providers, as well; it has the potential to dismiss the strains on infusion centers allowing greater patient access to care at oncology institutes.

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CONFLICT OF INTEREST

The authors disclosed no conflicts of interest related to this article.

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