

Dantrolene: a proposal for centralization of stock and flow redirection in the municipal hospital network in Rio de Janeiro

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Introduction

Malignant hyperthermia is a pharmacogenetic syndrome caused by the inhalation of halogenated anesthetics or the use of depolarizing muscle relaxants. Its greatest feature is an abnormal metabolic response, which results in symptoms such as tachycardia, arrhythmia, muscle rigidity and hyperthermia. The therapeutic protocol recommended for this disorder is dantrolene, a drug capable of reducing the activity of the RyR1 gene and, therefore, the hypermetabolic reaction. Considering the seriousness of the condition and its rapid evolution, it is requested that this medication be kept in stock for possible complications. However, the probability of use is relatively low, and the kits often expire, making it a challenge for the institutions' logistics and budget. The aim of the study was to assess the need to maintaining a stock of dantrolene per hospital unit and to propose the creation of distribution centers to serve these units in the municipal network of Rio de Janeiro.

Material and Methods

A literature review was carried out to assess the epidemiology and the maximum recommended time for the initiation of treatment for malignant hyperthermia. Data on the number of surgeries performed in the city of Rio de Janeiro were also accessed on the DATASUS platform in order to estimate the possible incidence of malignant hyperthermia in the population that underwent surgical intervention through the municipal public health system.

For a first analysis, considering the programmatic areas where hospitals are included, two hospitals units were designated as distribution centers to serve the largest possible number of hospitals. Furthermore, with the help of the Google Maps tool, distances and travel times between possible distribution centers and hospital units were calculated.

Finally, a consultation was carried out in the stock system of the municipality of Rio de Janeiro (SIGMA) on the availability of dantrolene kits in hospitals throughout the municipal network. The work was carried out in 2019.

Results and Discussion

The incidence of malignant hyperthermia in the general population is 1:50.000, which would mean approximately few cases of malignant hyperthermia compared to the total number of surgeries performed in the city. Furthermore, we are considering that in these surgeries the medications that cause this syndrome are necessarily used.

The analysis of distance *versus* time between central hospitals and dependent units indicates that some of the displacement periods remain within the maximum range of proposed use of dantrolene. However, some of the travel times would exceed the time required for patient safety.

The analysis of Dantrolene drug stocks in hospitals that perform surgery using SIGMA showed that there was a discrepancy in the number of kits between the units, with some with many kits and others

with no kit. With all these in mind, a centralized approach may be advantageous from a pharmacoeconomic point of view.

Conclusion

The creation of distribution centers in existing hospital units for the distribution of dantrolene kits can be considered aiming an improvement in the logistics of stocking this drug. The creation of distribution centers should be better studied, to assist the patients within the necessary time, without prejudice to their safety. An epidemiological study must be carried out in order to obtain the real incidence of malignant hyperthermia in hospitals in the city under study. In addition, an economic analysis must be carried out to prove the budgetary impact of these changes for the government.

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