

# Drug Supply During COVID-19 Pandemic: Remember Not to Run With Your Tank Empty

Hospital Pharmacy

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## Keywords

analgesics, critical care, dispensing, human resources, materials management/central supply

## To the Editor:

Coronavirus disease, also known as COVID-19, has been widespread around the world. In the first 3 months of this year, Italy became the country with the second-highest number of COVID-19 cases in the world after China.<sup>1</sup>

Intensive care unit (ICU) admissions for the most severe patients increased rapidly. Hospitals as a consequence have to expand ICU beds quickly, often by reconvert non critical wards to intensive care.<sup>2</sup>

Two out of the three ICU in our hospital (an academic hospital with 1095 beds in the northern east of Italy) have been designated to admit only COVID-19 patients (for a total of 21 beds) who require critical care management.

Today, the best treatment against the virus is still unknown. Critical care clinicians can only offer supportive therapy such as lung-protective ventilation and prone positioning after severe hypoxemia establishes.<sup>3</sup> Deep sedation and muscle relaxation are needed for the above mentioned supportive treatments, and they are achieved using continuous infusions of hypnotics and non-depolarizing neuromuscular blockers such as rocuronium or cisatracurium.<sup>4</sup> The huge amount of people admitted to the ICU for severe acute respiratory syndrome requiring high assistance activity produced an increased demand on personnel (physicians, nurses, and other support workers), equipment (ventilators, monitors, syringes), but also drugs (antibiotics, anti-viral, and sedative agents). We deployed personnel and equipment (by reducing scheduled surgical activity only to that which cannot be postponed like oncological surgery) to meet these demands. The exceptional increase in propofol and remifentanyl consumption have led our pharmacy to issue an alert due to difficult and rapid supply of these drugs. Chief of anesthesia and critical care department suggested so to use other sedative agents whenever possible other than propofol.

We compared the amount of drugs used for sedation and paralytic agents from January to March 2020 with the same period in 2019 (Figure 1). Although surgical activity has been curtailed, the use of some drugs has notably increased, especially propofol and cisatracurium; the latter increased by more than 100% compared to the same period of 2019 (Table 1).

The pharmacy, according to the provisions of the Italian Medicines Agency (AIFA), was forced to order the drugs required from abroad to deal with the lack of supply. However, if other countries follow our experience the problem will only be shifted and not solved, and drug supply will remain a critical point.

Hospitals need accurate stock information and potential bottlenecks across the entire supply chain to better prepare for the drug shortage. Consumption rates should be carefully evaluated by users and regularly audited.<sup>5</sup> Large hospitals are governed by hierarchical structures that tend to be slow at the best times, while leadership during a crisis is called to provide those at the forefront with the resources required quickly.

We encourage colleagues in ICUs to work closely with their pharmacy service and not overlook the threat of drug shortages in their battle against COVID-19.

You cannot run a car with an empty tank!

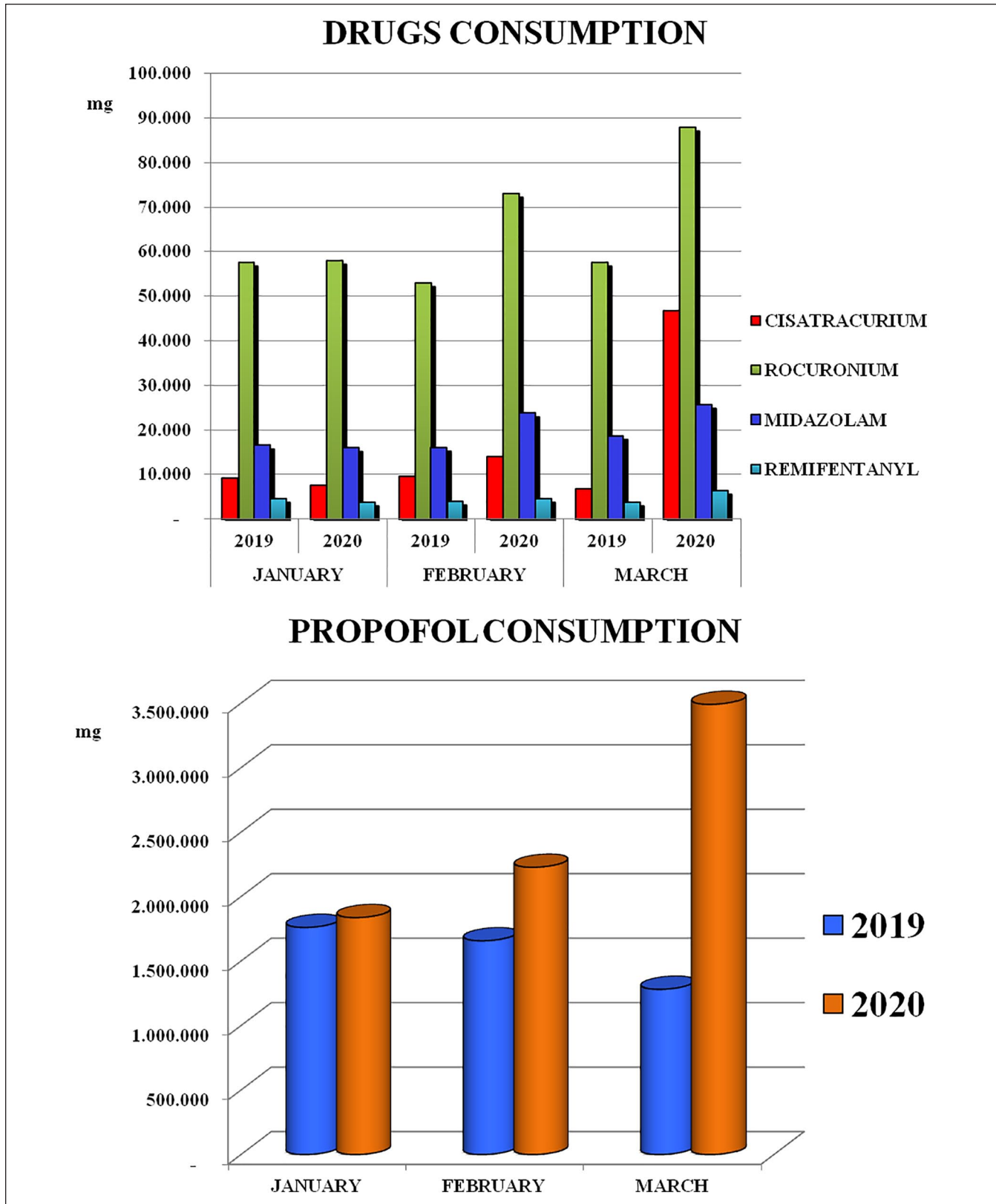
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**Figure I.** Propofol consumption during the first 3 months of 2020 compared to the same period of 2019 in the upper half of the figure. Cisatracurium, rocuronium, midazolam, and remifentanyl consumption during the first 3 months of 2020 compared to the same period of 2019 in the lower part of the figure.

**Table 1.** Drug Consumption Comparing January to March 2019 to the Same Period of 2020.

Drug	Jan-Mar 2019	Jan-Mar 2020	Δ%
Propofol (mg)	4 699 000	7 555 000	+61
Midazolam (mg)	49 930	65 500	+31
Dexmedetomidine (mg)	175	545	+211
Remifentanyl (mg)	12 420	14 935	+20
Rocuronium (mg)	168 000	219 000	+30
Cis-atracurium (mg)	25 800	68 400	+165

Note. Values are expressed of total milligrams (mg) used by ICUs. Last column in the right represents variation expressed as percentage.

### Authors' Contributions

CD, LV, and DO design the study, collected data and drafted the manuscript. AT and TP collected data and drafted the manuscript. TB, and ADM helped to draft the manuscript. All authors read and approved the final version of the manuscript.

### Declaration of Conflicting Interests

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