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Hospital Pharmacy Service: Facing the logistics of medicines procurement

El servicio de farmacia frente a la logística de adquisición de medicamentos

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Abstract

COVID crisis has abruptly broken into our hospitals, and many difficulties have emerged, including those related to supply logistics.

A huge number of new patients, a fast internal reorganization process and many other changes were suddenly established. These circumstances revealed the need to increase stocks of drugs, both for basic treatment as well as for specific SARS-CoV-2 infection management. At the same time, other problems (shortages, new and complex purchasing procedures, etc.) surfaced, so they could risk safety along the pharmacotherapeutic process.

The main objective was to develop and implement all the necessary measures within the logistics circuit in order to ensure the availability of medicines for patients, as safely and effectively as possible, during the Coronavirus crisis.

Firstly, two pharmacists were appointed to coordinate the whole process, and a preliminary analysis of the following aspects was carried out: an estimation of needs to make the initial drug provisioning, a storage feasibility study and a global analysis of the logistics process to detect critical points. Three different circuits for medicines supply were established as some drugs were operated by Agencia Española de Medicamentos y Productos Sanitarios (AEMPS) or Servicio Madrileño de Salud (SERMAS), and others were under no restrictions. For stocks control, inventory was frequently reviewed and monitoring of prescription trends was implemented. For all new medicinal products, compliance with security standards was reviewed and relabeling was carried out if necessary. Criteria were defined for the storage of overstocks and it was placed an isolated area for quarantined drugs. Shortages inevitably occurred but their effects were partly mitigated by AEMPS and SERMAS.

KEYWORDS
Logistics; Hospital pharmacy service; Coronavirus; SARS-CoV-2; Pandemic; Shortage.

Resumen

La crisis COVID ha irrumpido en los hospitales de forma abrupta, y ha planteado muchas dificultades de partida a todos los niveles, incluyendo la logística de adquisiciones. El aumento radical de pacientes, una aceleradísima reorganización interna y otros cambios pusieron de manifiesto un drástico incremento de necesidades, tanto de medicamentos básicos, como de aquellos específicos para soporte y tratamiento de la infección por SARS-CoV-2. Paralelamente, surgieron otras dificultades como desabastecimientos, procedimientos de compra nuevos y más complejos, etc., que podían comprometer la seguridad del proceso de utilización de medicamentos.

Nuestro objetivo consistió en establecer todas las medidas necesarias dentro del proceso logístico para garantizar de forma segura y eficaz la disponibilidad de los medicamentos para los pacientes durante la crisis COVID.

En primer lugar, se designaron los farmacéuticos responsables del proceso, y se realizó un análisis preliminar de los siguientes aspectos: estimación de necesidades para realizar una compra inicial, estudio de viabilidad de almacenamiento y análisis logístico global para detectar puntos críticos. Se establecieron tres circuitos de adquisiciones, según se tratase de medicamentos intervenidos por la Agencia Española de Medicamentos y Productos Sanitarios (AEMPS), por el Servicio Madrileño de Salud (SERMAS) o medicamentos no sujetos a restricciones. Para el control de *stocks* se implementaron revisiones frecuentes de inventario y seguimiento de las tendencias de prescripción. En las especialidades nuevas recibidas se revisó el cumplimiento de los estándares de seguridad y se realizó re-etiquetado en caso necesario. Se establecieron unos criterios para el almacenamiento de los *sobrestocks* y se destinó un área independiente para

PALABRAS CLAVE
Servicio de Farmacia Hospitalaria; Logística; Coronavirus; SARS-CoV-2; Pandemia; Desabastecimiento.

After all, we consider that the implemented procedure for logistics management may be reproducible, and the key points we have identified are the following: to enhance our quality management system, to develop an Action Plan for Healthcare Emergencies and to ensure the adequate training for all pharmacy staff. Furthermore, we also should address other aspects: to establish storage optimization strategies, to focus on a more advanced logistics management model, as well as to take advantage of the extraordinary multidisciplinary network, which has been consolidated during this COVID pandemic.

medicamentos en cuarentena. Los desabastecimientos fueron inevitables pero amortiguados por la gestión del SERMAS y la AEMPS.

Una vez superada la crisis, consideramos que el procedimiento implantado para la gestión logística es reproducible, y sus puntos clave para aplicabilidad futura son: mantener y potenciar nuestro sistema de gestión de calidad, elaborar un plan de actuación para emergencias sanitarias y garantizar la adecuada formación de todo el personal. Asimismo, existen otros aspectos que debemos abordar: establecer estrategias de optimización del almacenamiento, enfocarnos hacia un modelo de gestión logística más avanzado, así como aprovechar la extraordinaria red multidisciplinar consolidada durante la crisis.

Introduction

The media often compare the ongoing health emergency with a state of war. As in many war scenarios, the COVID crisis burst in hospitals in full fierce. Although some arrangements were already being made the days before the pandemic hit our country, hospitals were surprised by an unprecedented situation that collapsed our emergency services with massive hospital admissions and the setting up of critical care units that stretched our system beyond capacity.

Procurement and logistics in pharmacy services (HP) were marked by uncertainty, little certitude, and the compelling need for making rapid decisions to address every new problem that arouse.

Despite the difficulties, we relied on three essential tools to overcome this crisis: first, a management model based on a solid, integrated quality management system. Second, the culture of safety is key to being able to adapt to the circumstances without compromising patient safety. Finally, the commitment of the HP, which has helped us to overcome adversity: "*The true soldier fights not because he hates what is in front of him, but because he loves what is behind him*" (G. K. Chesterton).

Challenges and objectives

The exponential increase in the number of patients requiring hospitalization or discharge from the ICU with their medication forced the hospital to rapidly implement an organizational restructuring. In addition, the hospital took over the coordination of more than 30 nursing homes and a repurposed hotel, and provided logistic support to the IFEMA field hospital. In the face of this sudden increase in the demand for care, the HP had to hold a safety stock of basic drugs to guarantee their availability and meet the increased demand. With regard to drugs for the treatment of SARS-CoV-2 infection, a local therapeutic protocol was not established the weeks before the peak of the pandemic.

Procurement management was based on the guidelines of the Spanish Agency of Medicines and Medical Devices (AEMPS) and the regional health system of the Community of Madrid (SERMAS). This allowed a controlled, equitable distribution of drugs, but made the procurement process more complex for the HP.

Stockouts became commonplace, increased the workload and caused great concern and stress. The unprecedented global demand exceeded production and distribution forecasts, which could be fatal if adequate therapeutic alternatives were not established.

Finally, drug use safety was threatened by generalized instability and the risk factors posed by the crisis, namely:

- New staff: the incorporation of new HP technicians (16) and reallocation of personnel (18) during the pandemic resulted in the integration of 34 new professionals who were not familiar with local operational procedures.
- Regulatory issues[1,2]: drug import requirements were relaxed to facilitate imports and ensure drug availability.

In the mid of the pandemic, the hospital staff confronted an exorbitant and probably unapproachable workload.

We realized that our mission and premise was: *"No issue related to the HP can be a matter of concern or a problem for the hospital staff".*

The challenge was to optimize logistics management with the capacities and tools available to meet our ultimate goal: that the drugs needed by our patients were timely available at the right place and in sufficient quantity, as all measures possible were adopted to ensure the safety of the process.

Developed strategy: design, chain and stages of supply, and implantation

Design

A) Organization of HP activity:

The pharmacist usually in charge of medications in special situations took over the management of AEMPS drugs –i.e. COVID-19-specific drugs (Table 1).

The pharmacist in charge of drug management took over the following responsibilities:

- General logistics operations.
- Management of "SERMAS drugs" (Table 2) and other drugs.

Table 1. List of active substances taken over by the AEMPS

Active substance	N° of applicant patients
Baricitinib	0
Hydroxychloroquine / Chloroquine	4,034
Alpha interferon 2B	0
Interferon beta 1B	2 (**)
Lopinavir-Ritonavir	2,758
Remdesivir	10
Ruxolitinib	0
Sarilumab	0
Tocilizumab	337
	3 (**)

(**) Non-COVID treatments.

Table 2. List of active substances taken over by SERMAS

Active substance
Azithromycin
Cisatracurium
Dexmedetomidine
Midazolam
Propofol
Rocuronium

B) Initial provisioning:
A preliminary analysis of needs was performed based on hospital COVID-19 Committee recommendations (CCovidRYC) and local therapeutic protocols. With an estimated number of 1,000 patients (hospital management) and based on the mean monthly consumption of drugs, an initial supply was installed for 1.5 months.

C) Storage feasibility study:
The free spaces available were not enough. An unused compounding area was repurposed as a temporary warehouse. Another warehouse outside the HP premises was fitted out.
In Vall d'Hebron University Hospital (HUVH), Dr. Gorgas opted for renting some containers, as there was not enough storage space in the Hospital Pharmacy.

D) Global analysis of the logistics process:
Critical points were identified and preventive measures were adopted.
- Limitations of the information system: 5% of purchase orders failed. In relevant orders, the supplier was contacted on the phone after the order had been sent to confirm acknowledgement of receipt, stock availability and delivery term.
- New staff was only trained in store tasks (less versatility, greater safety). To consolidate training, personnel rotations between different HP areas were suspended.
- Limitations of the process:
  - The mean time established to claim on undelivered orders was reduced to two days since submission of the purchase order.
  - Coinciding with the extension of HP working hours, reception hours were also extended (24 x 7).

The HP of La Fe University Hospital of Valencia (Dr. García Pellicer) designed a decision-making scoreboard for AEMPS drugs: active patients, real stock, ordered stock, committed stock (necessary to complete the treatments started), new acceptable admissions, among others.
An initial supply for 3-4 months of selected drugs was purchased.

Supply chain and stages

Management of requests and donations

A special purchase order was made including 45 active substances (77 medicinal products) considered of first necessity.

For AEMPS drugs, an internal drug request procedure was implanted and constantly updated. In the case of complex-acquisition drugs such as remdesivir, which is requested at any time of the day for very critically-ill patients, this procedure ensured that the pharmacist could make a purchase order in a rapid and timely manner.

Purchase orders were placed via the AEMPS website for the acquisition of medications in special situations: initially, a request was submitted per patient. Later, this procedure was restricted to compassionate-use drugs and other special drugs. The remainder of drugs was requested daily using a single joint form containing the medical history numbers of all patients. Between March and April 2020, requests were processed for more than 4,000 patients (Table 1).

SERMAS communicated to the hospitals the drugs they have been allocated via e-mail, with amounts detailed and particular instructions given in relation to drug orders and donations. Many pharmaceutical products were new and sent from different supply sources, and involved different purchase and receipt instructions. These difficulties were overcome through seamless communication.

With respect to medicines not subject to the control of authorities, the standard acquisition procedure was applied, although the temporary modifications described above had to be applied. Donations of medicines and other medical products (eye drops, ointments, etc) were distributed equitably.

Suppliers provided intensive support and made a huge effort to dispatch medicines as fast as possible.

Stock control. Stockouts

Inventory management was more complex than usual and a daily revision of excess stock was performed daily.

Apart from the news reported by the CCovidRYC, an analysis of prescription trends was carried out (total dose prescriptions per drug with respect to the previous week). This procedure allowed early detection of an increase in the prescription of drugs such as olanzapine or aripiprazol (better drug interaction profile) and the immediate acquisition of these drugs.

With regard to shortages, AEMPS and SERMAS adopted a set of strict measures: imports were facilitated, therapeutic protocols were issued[3-5], communication with professionals was intensified, and information sharing between hospitals was promoted, among other actions. A collaborative network of HP managers was established to facilitate resource sharing.

Unfortunately, measures had to be adopted to ensure a rational and ethical use of drugs such as tocilizumab (Dr. Gorgas, HUVH).

Receipt and control

A total of 30 new medicinal products were received, 30% (9) of which were imported. The pharmacist ensured that the information provided was comprehensive, readable and clear[6]. Relabeling was performed when necessary.

Medicines with a short date of expiration were immediately used.

Storage and preservation

Drugs with a higher turnover index that could not be stored in automated warehouses were stored in the closest overstock spaces to facilitate restocking and/or dispensing. An information chart was designed to provide information of the drugs stored outside the automated warehouse and their location.

Drugs returned from COVID Units were quarantined in an isolated area. The amount of returned drugs increased as COVID units were transformed into non-COVID units, and three new refrigerators had to be installed.

Post-implantation analysis

Seventy-six percent of the drugs included in the initial supply order were received within 72 hours. In total, 5% were cancelled by suppliers due to shortages and the rapid intervention of stocks by the authorities.

To analyze the accuracy of the initial estimation of inventory purchases, the total units acquired were compared to the units used during the crisis (45 days): the stock was enough to meet the demand in 67% of medicines, insufficient in 17% and required further ordering, whereas 16% of medicines were overstocked, including some antibiotics which use was expected to be higher.

Lessons learned. Future applicability in pharmacy services

As the pandemic subsides, we wonder: Will the new purchasing procedure be applicable in a future COVID-19 outbreak? We think so. We have learned, designed and redesigned the procedure. The key points that will make this procedure applicable in the future are:

- Maintaining and improving our quality management system. This system allowed us to work in a rational, organized and systematic way. We also focused on meeting the requirements of the agents involved and conducted a continuous analysis of results.
- Designing an action plan for health emergencies that describes the rules and procedures designed and implanted, and ensuring the optimization of human and material resources.
- Guaranteeing that all HP staff is adequately trained. In logistics, individual performance is crucial, regardless of work status.
- Taking care and advantage of the extraordinary multidisciplinary professional network that has consolidated during the crisis, as they have played a crucial role.

Other aspects that deserve special attention include:

– Establishing storage optimization strategies: defining easily-transformable multi-use spaces (i.e. areas with mobile shelves), investing in *ad hoc* technologies, or remodeling spaces.

– Progressing to a "logistics management model 3.0", which should include, among others:
  - A robust, powerful, reliable and versatile system with a potent data mining capacity to facilitate data analysis.
  - Suppressing repetitive tasks that can be automated (as in other sectors) such as accounting entry recording and order processing, to name a few.
  - Integrating all the computer programs used for logistics, including external applications of suppliers, SERMAS, among others.
  - Building a shared inter-hospital platform compatible with local systems to facilitate routine operations such as borrowing requests or information sharing.

Further lessons learned:

Real-time information flow is essential for a decision-making based on the most recent evidence (Dr. M.ª Ángeles García, Clínica Universitaria de Navarra, Madrid).

In conclusion, the COVID crisis has confirmed what we knew and should not forget: the ultimate responsibility of HP is to guarantee the safe and effective availability of medicines for our patients. We are proud of having accomplished our goal to the best of our ability.

Bibliography

1. European Commission, European Medicine Agency and the European medicines regulatory network. Notice to stakeholders: Question and answers on Regulatory expectations for medicinal products for human use during the COVID-19 pandemic. 04/10/2020 [accessed 05/15/2020]. Available at: https://ec.europa.eu/health/sites/health/files/human-use/docs/guidance_regulatory_covid19_en.pdf
2. CMDh. Practical guidance of the CMDh for facilitating the handling of processes during the COVID-19 crisis. 04/2020 [accessed 05/15/2020]. Available at: https://www.hma.eu/fileadmin/dateien/Human_Medicines/CMD_h_/COVID-19/CMDh_418_220_Rev0_04_2020_-_PG_on_COVID-19_crisis.pdf
3. Agencia Española de Medicamentos y Productos Sanitarios. Tratamientos disponibles para el manejo de la infección respiratoria por SARS-CoV-2. 03/19/2020 [05/14/2020; 05/15/2020]. Available at: https://www.aemps.gob.es/la-aemps/ultima-informacion-de-la-aemps-acerca-del-covid%e2%80%9119/tratamientos-disponibles-para-el-manejo-de-la-infeccion-respiratoria-por-sars-cov-2/
4. Agencia Española de Medicamentos y Productos Sanitarios. Recomendaciones de la AEMPS para la gestión de medicamentos de uso habitual en las unidades de cuidados intensivos. 03/27/2020 [accessed 05/15/2020]. Available at: https://www.aemps.gob.es/informa/notasinformativas/medicamentosusohumano-3/2020-medicamentosusohumano-3/recomendaciones-de-la-aemps-para-la-gestion-de-medicamentos-de-uso-habitual-en-las-unidades-de-cuidados-intensivos/
5. Agencia Española de Medicamentos y Productos Sanitarios. Recomendaciones de la AEMPS para la gestión de medicamentos para el manejo de pacientes con enfermedades en fase terminal o paliativa en la situación sanitaria actual. 03/31/2020 [accessed 05/15/2020]. Available at: https://www.aemps.gob.es/informa/notasinformativas/medicamentosusohumano-3/2020-medicamentosusohumano-3/recomendaciones-de-la-aemps-para-la-gestion-de-medicamentos-para-el-manejo-de-pacientes-con-enfermedades-en-fase-terminal-o-paliativa-en-la-situacion-sanitaria-actual/
6. Instituto para el Uso Seguro de los Medicamentos (ISMP) España. Boletín de recomendaciones para la prevención de errores de medicación. Edición Especial COVID-19. 2020;49(4) [accessed 05/15/2020]. Available at: http://www.ismp-espana.org/ficheros/Boletin%2049%20%28Abril%202020%29.pdf