

SPECIAL

English

Recommendations by the Spanish Society of Hospital Pharmacy, the Spanish Society of Oncology Nursing and the Spanish Society of Medical Oncology for the safe management of antineoplastic medication in cancer patients

Recomendaciones de la Sociedad Española de Farmacia Hospitalaria, la Sociedad Española de Enfermería Oncológica y la Sociedad Española de Oncología Médica para el manejo seguro de la medicación antineoplásica del paciente con cáncer

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Abstract

Objective: To define recommendations that permit safe management of antineoplastic medication, minimise medication errors and improve the safety of cancer patients undergoing treatment.

Method: By reviewing the literature and consulting the websites of various health organisations and agencies, an expert committee from the Spanish Society of Hospital Pharmacy and the Spanish Society of Medical Oncology defined a set of safe practices covering all stages of providing cancer therapy to patients. The Spanish Society of Oncology Nursing revised and endorsed the final list.

Resumen

Objetivo: Definir unas recomendaciones que permitan el manejo seguro de la medicación antineoplásica, minimizar los errores de medicación y mejorar la seguridad de los pacientes oncológicos tratados.

Método: A partir de una revisión de la bibliografía, así como de la consulta de páginas web de varias agencias y organismos sanitarios, un comité de expertos de la Sociedad Española de Farmacia Hospitalaria y la Sociedad Española de Oncología Médica han definido una serie de prácticas seguras para todas las etapas de la provisión del tratamiento antineoplásico al paciente. La Sociedad Española de Enfermería Oncológica revisó y respaldó la lista final.

KEYWORDS

Antineoplastic agents; Medication errors; Patient safety; Prevention and control; Safety management organization and administration.

PALABRAS CLAVE

Agentes antineoplásicos; Errores de medicación; Prevención y control; Seguridad del paciente; Sistema seguro de organización y administración.



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Results: In total, 68 recommendations arranged in 5 sections were defined. They include issues concerning the training of health professionals, the technological resources needed, treatment planning, informing the patient and his family, the processes of prescribing, preparing, dispensing and administering cancer therapy (orally, parenterally or intrathecally), assessing patient adherence and treatment toxicity.

Conclusions: It is essential for healthcare establishments to implement specific measures designed to prevent medication errors, in order to ensure the safety of cancer patients treated with antineoplastic medication.

Introduction

The rising incidence and prevalence of cancer, and the rapid development of new treatment strategies, have resulted in greater diversity and complexity of cancer therapies in recent years. Because of improved survival and quality-of-life outcomes in many cancers, together with greater use of the oral route and better tolerability of many new drugs, increasing numbers of patients are receiving cancer therapy in oncology departments. This situation poses new challenges for achieving safe management of cancer drugs by the health professionals involved.

For decades, cancer therapy (particularly chemotherapy) has been the prime example of high-risk medication. The risk of fatality or serious complications entailed in chemotherapy¹, including cases with major social repercussions such as intrathecal delivery errors², has led the scientific community to introduce hitherto unheard-of multidisciplinary practices for validating and double-checking treatment, in order to improve cancer patient safety^{3,4}. With the aim of preventing various types of errors and

Resultados: Se han definido 68 recomendaciones estructuradas en 5 secciones. Se incluyen aspectos relacionados con la formación de los profesionales sanitarios; los recursos tecnológicos necesarios; la planificación del tratamiento; la información al paciente y a sus familiares; los procesos de prescripción, preparación, dispensación y administración del tratamiento antineoplásico (por vía oral, parenteral o intratecal), así como la evaluación de la adherencia del paciente y la toxicidad del tratamiento.

Conclusiones: El establecimiento de medidas concretas destinadas a prevenir los errores de medicación en los centros sanitarios es esencial para garantizar la seguridad de los pacientes oncológicos tratados con medicación antineoplásica.

risks of adverse effects in patients, a wide range of recommendations have been published in recent years^{5,6}. They include standardisation of treatment orders⁷, safe labelling⁸⁻¹⁰, checklists¹¹ or, more recently, computer order entry systems integrated with electronic health records and machine-readable coding during administration¹²⁻¹⁵. All these measures have contributed greatly to improving safety¹⁶, but do not entirely guarantee it¹⁷. Those recommendations were subsequently incorporated into national and international standards and guidelines^{5,18-23} by the American Society of Clinical Oncology (ASCO) and the Oncology Nursing Society (ONS)^{24,26}, the American Society of Health-System Pharmacists (ASHP)²⁷ and the Institute for Safe Medication Practices (ISMP), among others^{28,29}. Complying with certain standards is a mandatory requirement in current cancer care quality systems³⁰.

However, in the context of growing patient safety demands and rapid introduction of new treatments, establishing safe basic procedures may not be enough. In particular, the advent of oral drugs for non-hospital use has not been accompanied by the same safety requirements now in place for intravenous chemotherapy in the oncology hospital setting³¹. That has generated new risks and challenges in cancer patient care, such as monitoring adherence and educating patients about their treatment^{32,33}, resulting in new recommendations specifically for oral therapy^{34,35}, now included in the latest versions of international publications^{24,25,27}.

In Spain, no consensus document is yet available in which a full set of multidisciplinary measures is defined for the safe treatment of cancer patients with antineoplastic drugs. Some advisable practices are contained in other reports, such as the recent Strategic Plan for Pharmaceutical Care in Oncology/Haematology Patients by the Spanish Group for the Development of Oncology Pharmacy (GEDEFO)³⁶ or the document on oncology day hospitals produced by the Spanish Society of Medical Oncology (SEOM)^{37,38}.

The aim of this work has been to define a set of multidisciplinary safety recommendations for managing antineoplastic medications, to help prevent medication errors and improve the safety of cancer patients in Spain.

Methods

These consensus recommendations are based on a review of the available evidence about safe practices in cancer therapy, and the professional opinions of the Spanish Society of Medical Oncology (SEOM), the Spanish Society of Hospital Pharmacy (SEFH) and Spanish Society of Oncology Nursing (SEEO) experts.

Literature review

In order to identify safe practices regarding antineoplastic drug management, a structured literature search was performed in the PubMed database for publications on cancer therapy recommendations and safety and quality standards. The search was confined to articles published in English or Spanish between 1 January 2007 and 31 May 2017. The search syntax employed included the combination of MeSH descriptors and key words or text words shown in Table 1. This search identified 85 publications, from which 23 in total were finally selected by reading the abstracts^{1,2,4,6,7,9,11-13,16-19,24,25,27,28,30-33,35,39}.

The literature search was supplemented by a manual search for secondary references cited in the articles initially selected^{3,5,8,15,34}. A manual search for documents about standards or recommendations for safe prac-

Table 1. Search strategy in PubMed

#1	"antineoplastic agents"[Pharmacological Action] OR "antineoplastic agents/Therapeutic use"[MAJR] OR "Neoplasms/drug therapy"[MAJR] OR ("antineoplastic"[All Fields] AND "agents"[All Fields]) OR "antineoplastic agents"[All Fields] OR "anticancer drugs"[All Fields] OR "Antineoplastic drugs"[All Fields]
#2	"medication errors/prevention and control"[MAJR] OR ("medication errors"[MeSH Terms] AND "prevention and control"[Subheading]) OR ("prevention"[All Fields] AND "control"[All Fields]) OR "prevention and control"[All Fields] OR "prevention"[All Fields] OR "preventing"[All Fields] AND ("medication"[All Fields] AND "errors"[All Fields]) OR "medication errors"[All Fields]
#3	#1 AND #2
#4	"chemotherapy administration safety standards"[All Fields] AND ("neoplasms"[MeSH Terms] OR "neoplasms"[All Fields] OR "cancer"[All Fields])
#5	#3 OR #4
#6	"recommendation"[All Fields] OR "Recommendations"[All Fields] OR "guides"[All Fields] OR "practical guides"[All Fields] OR "consensus"[All Fields] OR "guideline"[Publication Type] OR "Practice Guideline"[Publication type] OR "guidelines as topic"[MeSH Terms] OR "guidelines"[All Fields] OR "update"[All Fields] OR "review"[Publication Type] OR "review literature as topic"[MeSH Terms] OR "review"[All Fields] OR "systematic review"[All Fields]
#7	#5 AND #6
#8	"2007/01/01"[PDAT] : "2017/12/31"[PDAT]
#9	Spanish[lang] OR English[lang]
#10	#7 AND #8 AND #9

tices with cytostatics was also performed on the websites of the following health organisations and agencies:

- Institute for Safe Medication Practices, Canada²⁹.
- Cancer Care Ontario, Canada^{5,10,13,20,22}.
- Health Care Improvement, Scotland²³.
- National Health Service: North Wales Cancer Network, United Kingdom⁴⁰.
- Spanish Agency of Medicines and Medical Devices.
- GEDEFO³⁶.
- SEOM^{37,38}.

Initial selection of safe practices by an expert committee

For the production of this document, SEOM and SEFH set up a committee of experts in cancer therapy and drug safety, composed of four specialists from each society.

The first stage involved the experts analysing the publications selected during the literature search, in order to identify and compile safe practices covering all stages of cancer therapy provision. The expected benefits were taken into account, as was the feasibility of incorporation into Spanish healthcare practice. This stage identified 74 safe practices, which were discussed and screened at a meeting attended in person by the expert committee members. Several rounds of revision then took place between the committee members, working remotely. At the end of this process, 68 practices were selected in total.

Revision of selected practices by independent professionals, and production of the consensus statement

The expert committee drafted a set of recommendations for the safe management of cancer medication, containing the 68 selected practices. This draft was e-mailed to various health professionals belonging to SEFH and SEOM, who had been chosen in advance for their knowledge of this field. They were asked for comments and suggestions about the practices included, in terms of content and wording. They were also given the opportunity to suggest the inclusion of new practices.

All the comments and suggested amendments to the contents and form of the document, sent by the health professionals consulted, were analysed and discussed by the expert committee until an agreed draft list of safe practices was achieved.

This draft list of safe practices was then submitted for review and endorsement to the SEEO, which suggested additional comments and amendments to clarify some practices. These amendments were discussed by the expert committee and were included in the final document.

Results

Table 2 contains the full list of safe practices for the management of cancer therapy agreed by this expert committee. This list includes 68 practices divided into 5 sections, following a scheme like the one used in the ASCO/ONS chemotherapy administration safety standards²⁴. Section 1 contains 17 general measures intended for healthcare establishments, about the training of health professionals involved in cancer patient treatment, the human and technological resources needed, the standard operating procedures that should exist, and procedures for continuity of care and risk management. Section 2 supplements the above with 9 practices related to cancer therapy planning, informed consent, and informing the patient and his family or carers about medication.

Section 3 contains 33 practices addressing the stages of prescribing, preparing, dispensing and administering oral and parenteral cancer therapy, including specific measures for intrathecally delivered medication. This section is supplemented by Section 4, which contains 5 practices on treatment monitoring, including the assessment of patient adherence and cancer treatment toxicity. Lastly, the 4 practices in Section 5 briefly highlight the importance of ensuring the safety of health professionals who prepare and administer antineoplastic medication. It was decided that in-depth consideration of this issue was beyond the scope of this document, because it did not form part of the initial aim of these recommendations.

Discussion

Medication safety management is a critical aspect of cancer patient care. Because antineoplastic drugs have a narrow therapeutic range, medication errors that can arise for various reasons during the course of treatment carry a high risk of causing patients serious adverse effects or compromising the clinical benefit of therapy. Safe practices to minimise them and prevent unnecessary harm to patients must therefore be implemented. Aware of this need, SEFH and SEOM have worked closely together to produce a multidisciplinary document that brings together a set of fundamental practices to ensure the safety of cancer patient care. Starting from a literature review, an expert committee produced a set of recommendations tailored to Spain. These were revised by a group of independent professionals from both societies and endorsed by the SEEO.

The recommendations are intended for healthcare establishments and professionals who provide parenteral and oral cancer therapy, either with commercially available medications or with clinical research products. The recommendations address all stages involved in the process of providing cancer drug treatment, from prescribing to patient monitoring. Additionally, they cover other measures considered essential for improving cancer patient safety, some of which entail profound change in an organisation's culture. Examples include continuing professional development and assessment of competence, standardisation of all working procedures and healthcare protocols, and setting up risk management systems. All of these are crucial for improving safety. These recommendations also incorporate the minimum technological and human resources that need to be available at healthcare centres in order to reduce variability of care provided, ensure fairness, and assure the safety of cancer therapy.

Today, cancer is regarded as a chronic disease, and oral antineoplastic therapies are increasingly used. Together, these two facts have required patient care strategies to change direction, towards a cooperative multidisciplinary model, in which it is particularly important to inform and talk to the patients and/or carers who will have to be actively involved in treatment. One whole section of recommendations is therefore devoted to this. The document contains other fundamental practices in these patients, such as monitoring adherence and reconciling treatments during transitions of care.

The practices listed in this consensus statement are not intended as safety standards for healthcare establishments, because the scientific societies that produced them do not provide certification. Nevertheless, these specific measures aimed at preventing medication errors should obviously be adapted and implemented by healthcare establishments, in order to improve the safety of the care they provide. This document is also intended to assist health professionals, who can use the recommendations as a benchmark for their healthcare practice.

Lastly, it should be noted that SEFH, SEOM and SEEO intend to promote the development of initiatives to encourage the introduction of these recommendations, and to update them periodically, when new practices are developed that affect the safety of cancer therapy. The aim is for patients receiving antineoplastic therapy in Spain to do so with maximum assurances of quality and safety.

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Conflict of interests

No conflict of interests.

Table 2. SEFH//SEEO/SEOM antineoplastic drugs safety recommendations

1. General measures for healthcare centres: training, resources, procedures, continuity of care and risk management	
<p>1.1. The hospital has a procedure for ensuring that all health professionals involved in treating cancer patients have the necessary knowledge and skills and are competent to perform their functions. For this purpose, the following have been established:</p> <ul style="list-style-type: none"> 1.1.1. The educational requirements and competencies of newly joined professionals. 1.1.2. The continuing professional development requirements demanded of staff, which should be updated at least once a year. 1.1.3. The criteria for accreditation by authorised independent organisations, and how this accreditation is documented. 1.1.4. The criteria for assessing the competence of professionals. 1.1.5. A full training programme that ensures compliance with the established requirements for initial and continuing training for all categories of staff who prescribe, dispense, prepare and administer cancer therapies. <p>1.2. The hospital has sufficient staff to ensure that individuals assigned to each healthcare process are suited to the volume of work, so that established safe practices are followed and high-risk behaviour encouraged by high pressure on care staff is avoided.</p> <p>1.3. At least one specialist in medical oncology and one oncology nurse trained in basic life support are at the hospital and are available immediately when the antineoplastic therapy is administered.</p> <p>1.4. The hospital has an information and communication technology-based integrated information system for the management of cancer patients (inpatients, outpatients and external patients). It is integrated into the single medical record and the hospital's information systems, so that full information about the cancer patients and their medication is available to all health professionals who provide them with care, including emergency care.</p> <p>1.5. The hospital has in place standard operating procedures designed to prevent errors, containing clear definitions of the processes for medical prescribing, pharmaceutical reviewing, preparing, dispensing, administering and monitoring antineoplastic therapy, and staff responsibilities in each process.</p> <p>1.6. The hospital has up-to-date, evidence-based treatment protocols, clearly and unambiguously written, and accessible to all health professionals involved in cancer patient care. Those protocols specify at least the following aspects of each treatment regimen:</p> <ul style="list-style-type: none"> 1.6.1. Name of the protocol/regimen. 1.6.2. Tumour and stage for which it is intended. 1.6.3. The full antineoplastic therapy, including drugs to be administered orally or by other routes, and the order of administration of each drug. 1.6.4. Administration route of all drugs. 1.6.5. Dose of all drugs and calculation method. 1.6.6. Drug diluent and volume, if applicable. Specific filters and tubing, when needed. 1.6.7. Rate and duration of administration. 1.6.8. Administration frequency and time intervals. 1.6.9. Laboratory tests required to monitor toxicity. 1.6.10. Dose adjustments for each agent, according to laboratory test results and/or adverse effects. 1.6.11. Expected adverse reactions and their treatment. 1.6.12. Supportive therapy (hydration, antiemetics, etc.). <p>1.7. Before the first cycle of a new treatment regimen is administered, essential information about the patient and the therapy is entered in the medical records, including:</p> <ul style="list-style-type: none"> 1.7.1. Histopathological confirmation or verification of the initial diagnosis. 1.7.2. Initial cancer stage and current status. 	<ul style="list-style-type: none"> 1.7.3. Full medical history (including comorbidities) and physical examination. 1.7.4. Weight and height. 1.7.5. Full list of the patient's concomitant medication (see 1.12). 1.7.6. History of allergy or hypersensitivity reactions. 1.7.7. Initial psychosocial assessment and actions taken when indicated. 1.7.8. Antineoplastic treatment plan, including at least the patient's diagnosis, drugs, doses, duration of therapy and goals of therapy. 1.7.9. Expected frequency of follow-up visits and patient monitoring appropriate for the individual antineoplastic agents. <p>1.8. At each clinical consultation or on each day of treatment, healthcare staff carries out an assessment of the patient and documents it in the medical records. This should include:</p> <ul style="list-style-type: none"> 1.8.1. Performance status. 1.8.2. Vital signs. 1.8.3. Weight. 1.8.4. Hypersensitivity reactions and other adverse events that occurred during treatment administration. 1.8.5. Adverse reactions experienced with the treatment. 1.8.6. Pain assessment. <p>1.9. At each visit, the patient's treatment is reviewed and updated if required by the oncologist and validated by the pharmacist.</p> <p>1.10. Oral antineoplastic therapy is subject to the same documentation, prescribing, validating and dispensing procedures as parenteral therapy.</p> <p>1.11. Antineoplastic treatments given in clinical trials should follow the same safe practices described in this document as for commercially available treatment, in order to prevent medication errors.</p> <p>1.12. At the first consultation, before each treatment cycle begins, a structured procedure is used to obtain a full list of medication being taken by the patient, including prescription and non-prescription drugs, vitamins, herbal medicines and substance abuse, and that list is compared and reconciled with drugs prescribed during the consultation and upon any subsequent transition of care. At the following consultations, a procedure will be used to learn of subsequent changes in treatment, and they will be reviewed by the pharmacist.</p> <p>1.13. The hospital has in place a standard procedure for reconciling treatment at discharge, which ensures appropriate education of patients or carers and good communication with professionals who care for the patient, to ensure suitable treatment monitoring.</p> <p>1.14. The hospital has a full-time emergency department for dealing with treatment-related adverse reactions and emergencies in cancer patients. If required, an oncologist can be consulted, and there is the option of transferring the patient to a site with specialist oncology services.</p> <p>1.15. The hospital has rules in place for recording and reporting adverse drug reactions.</p> <p>1.16. The hospital has an interdisciplinary patient safety or risk management committee, which has set up a reporting system enabling health professionals to report adverse events, potential events and medication incidents that occur at the site. The committee analyses these incidents in order to introduce measures designed to prevent their recurrence. It also reviews external errors and published information about new safe practices and develops and implements effective practices for improving the safety of cancer therapy.</p> <p>1.17. The hospital has a general or specific quality management system for oncology procedures, which is accredited or certified by an external body.</p>

Table 2 (cont.). SEFH//SEEO/SEOM antineoplastic drugs safety recommendations

2. Treatment planning, patient consent and information	3. Prescribing, preparing, dispensing and administering treatment
<p>2.1. The hospital has a standard procedure for obtaining informed consent from patients and documenting it before they receive cancer therapy.</p> <p>2.2. Before each treatment regimen begins, the existence of informed consent to treatment is verified.</p> <p>2.3. Patients are provided with verbal and written information (supported by applications or websites) before the first treatment administration, and at subsequent visits if required or if changes occur. The information consists of at least:</p> <ul style="list-style-type: none"> 2.3.1. The patient's diagnosis and treatment objectives, i.e. curing disease, prolonging life or reducing symptoms. 2.3.2. Expected treatment duration and dosing schedule. 2.3.3. Names of antineoplastic drugs and supportive medication, and possible interactions with drugs or food. 2.3.4. Expected adverse effects of treatment and specific measures for minimising them. Patients of reproductive age must be informed about the risks of sterility and resources for preserving fertility. 2.3.5. Procedures for handling drugs, excreta and waste at home. 2.3.6. Monitoring plans and hospital contact details. 2.3.7. Warning symptoms that may require urgent medical attention. <p>2.4. Information is provided to family or carers, depending on the patient's decision and ability to take responsibility for treatment management. Information materials should be suited to the understanding of the patient or carer. Provision of information should include feedback from the patient or carer, that shows understanding and commitment to follow instructions appropriately.</p> <p>2.5. When the hospital pharmacy department dispenses drugs intended for cancer therapy to patients, specifically trained pharmacists provide the patients or carers with verbal and written information about the following issues concerning their medication:</p> <ul style="list-style-type: none"> 2.5.1. Safe handling of the medication and additional precautions (treatment of excreta and waste). 2.5.2. Storage conditions. 2.5.3. Administration instructions. 2.5.4. Dosage and advisability of adhering to treatment. 2.5.5. What to do in the event of forgotten doses or vomiting. 2.5.6. Dose adjustments, as prescribed by the oncologist, when applicable. 2.5.7. Additional information about adverse effects and how to manage them, especially dose-limiting effects. 2.5.8. Potential interactions with other drugs, food or alternative therapies. 2.5.9. Contact details for contacting the site if necessary. 2.5.10. Returning unused medication to the pharmacy. <p>2.6. When home treatment dosage is intermittent or changed because of toxicity, proper understanding by the patient or carer must be ensured.</p> <p>2.7. It is important to define and coordinate in each hospital, both for parenteral and oral treatments, the complementary roles of the various health professionals (medical oncologists, pharmacists and oncology nurses), and their responsibility for the patient's health education and follow-up, reinforcing key information while avoiding redundancy and inefficiency.</p> <p>2.8. The hospital has comprehensive, up-to-date resources and information sources. Verbal and written information provided must be comprehensible and updated regularly. A translation system must be available, if necessary, to enable the patient to understand the treatment plan. The use of patient diaries is recommended, to assist with adherence and to record incidents or adverse effects.</p> <p>2.9. The hospital encourages the development of new technologies designed for good patient education, which facilitate better access to information about medication and the patient's active involvement in his cancer therapy.</p>	<p>3.1. Medical prescriptions for antineoplastic therapies are signed by hand or electronically.</p> <p>3.2. The hospital has a specific policy for prescriptions for antineoplastic therapies, which ensures that:</p> <ul style="list-style-type: none"> 3.2.1. Verbal orders are not permitted, except to discontinue or cancel the administration of antineoplastic drugs. 3.2.2. Any change or new treatment is documented in the medical records, as are any dose adjustments to oral treatments communicated directly to the patient. <p>3.3. The hospital has a computer physician order entry system integrated into the medical records, equipped with clinical decision support systems that minimise prescribing errors (dose calculation alert systems based on body measurements or biomarkers, adjustments according to clinical situations, allergies, maximum doses and disease-specific decision trees).</p> <p>3.4. The hospital uses standard, pre-printed or electronic forms for each cancer therapy regimen.</p> <p>3.5. Medical prescriptions for antineoplastic therapies state at least the following elements:</p> <ul style="list-style-type: none"> 3.5.1. Patient's full name. 3.5.2. A second unambiguous patient identifier (medical record number or date of birth). 3.5.3. Weight, height and body surface area. 3.5.4. Prescription issue date. 3.5.5. Diagnosis and name of the regimen or protocol. 3.5.6. Cycle number and day, when applicable. 3.5.7. Full generic drug names (including trade name in the case of biosimilars). 3.5.8. Drug dose according to the protocol: theoretical dose according to the regimen and resultant dose for the patient, dose adjusted according to pharmacokinetic or laboratory parameters, and correction factor used for any dose increase or reduction. 3.5.9. Administration date. 3.5.10. Route of administration. 3.5.11. Vehicle used and final volume of solution prepared. 3.5.12. Allergies. 3.5.13. Supportive care treatments appropriate for the treatment regimen: pre-medication, hydration, growth factors, drugs to prevent hypersensitivity reactions, and antiemetic therapy when applicable. 3.5.14. Sequencing of drug administration, when applicable. 3.5.15. Administration rate, when applicable. 3.5.16. Prescriber's ID, including his signature or corresponding electronic ID. <p>3.6. Prescriptions for oral antineoplastic drugs state the following:</p> <ul style="list-style-type: none"> 3.6.1. Patient's full name. 3.6.2. A second unambiguous patient identifier (medical record number or date of birth). 3.6.3. Weight, height and body surface area. 3.6.4. Prescription issue date. 3.6.5. Diagnosis and name of the regimen or protocol. 3.6.6. Full generic drug name. 3.6.7. Drug dose according to the protocol: theoretical dose according to the regimen and resultant dose for the patient, dose adjusted according to pharmacokinetic or laboratory parameters, and correction factor used for any dose increase or reduction. 3.6.8. Route of administration and special instructions, if any. 3.6.9. Amount of drug to be dispensed. 3.6.10. Dosing schedule. 3.6.11. Duration of treatment, when applicable. 3.6.12. If appropriate, the instructions should state how drugs should be taken as regards food intake, and whether certain food types can affect the efficacy or toxicity of the medication. 3.6.13. Prescriber's ID, including his/her signature or corresponding electronic ID.

Table 2 (cont.). SEFH//SEEO/SEOM antineoplastic drugs safety recommendations

3 (cont.). Prescribing, preparing, dispensing and administering treatment

3.7. All prescription orders for cancer therapies, including oral medication, must be validated by a hospital pharmacist specifically dedicated to cancer therapy.

3.7.1. Validation is mandatory as an independent preliminary step in treatment preparation.

3.7.2. In order to validate the treatment order, the pharmacist checks the patient's previous treatment (paying attention to cumulative maximum doses), and verify all drugs and administration routes, scheduling, if all doses are correct according to patient weight, BSA and renal and liver function, potential interactions, the patient's allergies, dose adjustments related to previous adverse effects, compliance with site protocols, and whether patient blood counts and other laboratory results allow the treatment to be administered.

3.7.3. If any discrepancies are found in the validation process, they must be resolved with the prescribing physician before the preparation process continues.

3.8. The hospital has a system for ensuring that preparation is safe and traceable, covering all stages from the prescribing to the administration of antineoplastic drugs.

3.8.1. Antineoplastic therapies must be prepared under the control and supervision of the hospital pharmacy department.

3.8.2. When antineoplastic therapies administered on-site are prepared off-site, the external site must satisfy all the general requirements for quality, safety and traceability.

3.9. It must be ensured that antineoplastic therapies are prepared by specifically trained staff.

3.9.1. Antineoplastic therapy must be prepared by health professionals trained to prepare such treatments, and under the direction of a specifically dedicated hospital pharmacist.

3.9.2. Health professionals (nurses, technicians) involved in preparing antineoplastics must know the rules of cytotoxic drug management and receive specific training before they start work and regularly thereafter.

3.10. The material resources available must allow antineoplastic medication to be prepared under conditions of safety for both patient and healthcare staff, according to legislation and good manufacturing practice.

3.10.1. Cancer drugs should be prepared in clean rooms, under negative pressure and using aseptic technique.

3.10.2. Specific Class II Type B2 biosafety cabinets are used for preparing cytostatics, and personal protective equipment is worn, in accordance with current regulations.

3.10.3. Only authorised staff is allowed in the preparation area.

3.10.4. Each site should assess whether it is cost-effective to use robots for preparing cytostatics. These devices improve the accuracy of preparation and provide additional elements of safety.

3.11. There should be a safety policy for selecting and storing antineoplastic drugs, aimed at preventing errors with drugs that have similar names or packaging, and to avoid the coexistence at the hospital of presentations of different concentrations. If the usual presentations are changed, staff must be informed, and the computer program updated.

3.12. The pharmacy department has standard guidelines or protocols specifying the composition, reconstitution, dilution, stability, labelling, etc. of each drug used in cancer therapies at the site.

3.13. Antineoplastic therapy is prepared in the cabinet for one patient at a time, and each drug is prepared individually.

3.14. Antineoplastic therapy is prepared in such a way that no further preparation is required by the health professional responsible for administering the treatment. Priming of intravenous tubing and syringes is performed inside the safety cabinet.

3.15. A standardised labelling method is available for ensuring easy identification of patient, medication, route and dose. Labels are printed

(not handwritten). Mixtures are labelled as soon as they are prepared. The label is checked against the physician order and the worksheet.

Labelling for injections includes:

3.15.1. Patient's full name.

3.15.2. A second unambiguous patient identifier (medical record number or date of birth). Location if applicable.

3.15.3. Generic drug name.

3.15.4. Drug dose expressed in terms of total content (total dose/total volume).

3.15.5. Diluent.

3.15.6. Route of administration.

3.15.7. Administration rate and duration of infusion.

3.15.8. Preparation date and administration date.

3.15.9. Expiry date and storage conditions.

3.15.10. Instructions for administration (e.g. needs a filter), if applicable.

3.15.11. Additional warning label about handling cytotoxics.

3.16. Cancer drugs dispensed at hospital for external patients can be labelled individually per patient or provided in their commercial packs.

3.16.1. When medication is dispensed individually labelled for a patient, the labelling includes:

3.16.1.1. The patient's name a second unambiguous identifier.

3.16.1.2. Generic drug name.

3.16.1.3. Pharmaceutical form and dose.

3.16.1.4. Route of administration.

3.16.1.5. Batch number, expiry date and storage conditions.

3.16.2. When medication is provided in its commercial forms of presentation, the labelling includes items 3.16.1.2 to 3.16.1.5.

3.16.3. The pharmacy department uses bar codes or other systems to verify all medication dispensed to patients or carers for cancer therapies.

3.17. In the case of cancer medication pertaining to a clinical trial, as well as the above-mentioned points, the guidance for the trial protocol is followed. The clinical trial protocol and the time of preparation are stated on the labelling.

3.18. The components of intravenous mixtures of cancer drugs are verified using bar codes or a similar system. Additionally, a gravimetric method is used to verify correct preparation of the mixture. If this is not possible, the filled syringes and vials are independently double-checked by staff other than the person who prepared them, before they are added to the final solution. The check performed is recorded in writing.

3.19. After the prepared mixture has been verified, the antineoplastic drug is inserted into a plastic bag with a leak-proof closure. Transparent bags facilitate identification by nursing staff, with no need for unpacking. Bags are transported in an easily washed, rigid container, identified with the cytotoxic hazard symbol, containing an absorbent plastic pad at the bottom.

3.20. Until they are transported, prepared mixtures are stored, in accordance with the storage conditions, in a properly identified, purpose-designed area, bearing in mind the stability data for the mixture.

3.21. Prepared mixtures are transported by properly trained healthcare staff. The use of mechanical transport systems such as pneumatic tubes is not recommended.

3.22. Antineoplastic therapy is administered by a qualified member of nursing staff.

3.23. Before antineoplastic therapy is first administered, an expert nurse must check for the presence of risk factors for extravasation. If several factors are present, prior insertion of a central line should be evaluated.

3.24. Before each administration of antineoplastic therapy, patient ID is verified by an expert nurse in the presence of the patient, using at least two identifiers: full name, and a second unambiguous identifier (medical record number, date of birth, or verification by national ID card when administration takes place outside the hospital).

Table 2 (cont.). SEFH//SEEO/SEOM antineoplastic drugs safety recommendations

3 (cont.). Prescribing, preparing, dispensing and administering treatment	3 (cont.). Prescribing, preparing, dispensing and administering treatment
<p>3.25. Before the start of each administration cycle, an expert nurse confirms the treatment with the patient: drug name, infusion time, route of administration, and infusion-related symptoms that must be reported, stipulating which symptoms must be reported urgently by the patient.</p> <p>3.26. Before each administration of cancer therapy, the following are verified and documented by an expert nurse:</p> <ul style="list-style-type: none"> 3.26.1. Drug name. 3.26.2. Dose. 3.26.3. Route of administration. 3.26.4. Volume to be infused. 3.26.5. Administration rate. 3.26.6. Expiry date and time. 3.26.7. Appearance and physical integrity of the drugs. 3.26.8. Integrity and suitability of chemotherapy delivery devices: medical devices and infusion pumps. <p>3.27. The patient's clinical status is documented by nursing staff during treatment and after it ends.</p> <p>3.28. Whenever possible, technologies are introduced to improve patient safety, such as traceability by bar code, data matrix, radio-frequency identification (RFID) or other system, with data transfer to smart infusion pumps.</p> <p>3.29. Systems for recording administered medication are available, so that medication errors can be more easily prevented, and full details can be kept of treatment given.</p> <p>3.30. Extravasation management procedures are defined and antidotes with protocols for using them are available.</p> <p>3.31. Hospitals ensure that home administration of antineoplastic drugs meets the same requirements as at hospital.</p> <p>3.32. At hospitals where intrathecal medication is prepared and/or administered, specific procedures exist to prevent treatment-related errors. They include at least the following:</p> <ul style="list-style-type: none"> 3.32.1. Intrathecal chemotherapy is prepared separately from intravenous chemotherapy. 3.32.2. The labelling of medication for intrathecal use clearly states "for INTRATHECAL use only", written out in full, in bold capital letters. 3.32.3. Prepared mixtures are stored separately from intravenous chemotherapy. 3.32.4. Drugs for intravenous use and for intrathecal use are not dispensed together for the same patient. 3.32.5. Intrathecal chemotherapy is administered after having been independently double-checked by the physician and by the nursing staff involved in administering it. 	<p>3.33. All vinca alkaloids are prepared in the pharmacy department in ready-to-administer minibags. The following warning is displayed: "For intravenous use only. Fatal if administered by other routes".</p>
4. Follow-up after antineoplastic drug administration: adherence, toxicity and complications	4. Follow-up after antineoplastic drug administration: adherence, toxicity and complications
	<ul style="list-style-type: none"> 4.1. The hospital has specific procedures for monitoring treatment response, defining the appropriate timing for assessing the treatment regimen and the necessary functional tests. 4.2. The hospital has a defined policy for new treatments for patients, which considers: <ul style="list-style-type: none"> 4.2.1. The availability of new treatments. 4.2.2. Monitoring procedures and care plan. 4.3. The hospital has a procedure for evaluating, at each visit by the patient, his treatment adherence as well as the toxicity associated and its treatment. 4.4. The hospital has a procedure for evaluating and documenting treatment-related adverse reactions and dose adjustments required, and for reporting them before subsequent administration. 4.5. For drugs associated with cumulative toxicity, the doses administered are monitored.
5. Staff safety	5. Staff safety
	<ul style="list-style-type: none"> 5.1. Health professionals are adequately trained in safety procedures and updated in hazardous drugs handling, and wear personal protective equipment suitable for preparing, dispensing and administering cancer drugs, and for handling the patient's body fluids. 5.2. The hospital employs standard operating procedures for preparation and administration, which ensure the safety of people handling cancer drugs, including the use of closed system transfer devices (CSTD) to reduce the risk of vapours and aerosols being released. 5.3. The hospital has a protocol to manage accidental exposures and a spill kit is available, with appropriate instructions for use, for those cases, which are registered 5.4. The hospital has policies and procedures regarding cytotoxic waste management, in accordance with current legislation.

Bibliography

- Schwappach DL, Wernli M. Medication errors in chemotherapy: Incidence, types and involvement of patients in prevention. A review of the literature. *Eur J Cancer Care (Engl)*. 2010;19(3):285-92. DOI:10.1111/j.1365-2354.2009.01127.x
- Marliot G, Le Rhun E, Sakji I, Bonnetterre J, Cazin JL. Securing the circuit of intrathecally administered cancer drugs: Example of a collective approach. *J Oncol Pharm Pract*. 2011;17(3):252-9. DOI:10.1177/1078155210372550
- Markert A, Thierry V, Kleber M, Behrens M, Engelhardt M. Chemotherapy safety and severe adverse events in cancer patients: Strategies to efficiently avoid chemotherapy errors in in- and outpatient treatment. *Int J Cancer*. 2009;124(3):722-8. DOI:10.1002/ijc.23991
- Jaehde U, Liekweg A, Simons S, Westfeld M. Minimising treatment-associated risks in systemic cancer therapy. *Pharm World Sci*. 2008;30(2):161-8. DOI:10.1007/s11096-007-9157-4
- Easty AC, Coakley N, Cheng R, Cividino M, Savage P, Tozer R, *et al*. Safe handling of cytotoxics: Guidelines recommendations. *Curr Oncol*. 2015;22(1):e27-37. DOI:10.3747/co.21.2151
- Gramage Caro T, Palomar Fernández C, Pueyo López C, Sánchez Cuervo M, Gómez de Salazar López de Silanes ME, Bermejo Vicedo T. Validating a classification scheme for medication errors to be used in chemotherapy. *Farm Hosp*. 2011;35(4):197-203. DOI:10.1016/j.farma.2010.04.006
- Saad A, Der-Nigoghossian CA, Njeim R, Sakr R, Salameh P, Massoud M. Prescription errors with chemotherapy: Quality improvement through standardized order templates. *Asian Pac J Cancer Prev*. 2016;17(4):2329-36.
- Trudeau M, Green E, Cosby R, Charbonneau F, Easty T, Ko Y, *et al*. Key components of intravenous chemotherapy labeling: A systematic review and practice guideline. *J Oncol Pharm Pract*. 2011;17(4):409-24. DOI:10.1177/1078155210385160
- Ng T, Badry N, de Lemos ML. Rationalizing the use of auxiliary label for oral oncology drugs. *J Oncol Pharm Pract*. 2017;23(5):338-43. DOI:10.1177/1078155216650986
- Trudeau M, Green E, Cosby R, Charbonneau F, Easty T, Ko Y, *et al*. Patient Safety Issues: Key Components of Chemotherapy Labelling 2009 [cited 2018 April 11]. Available at: <https://www.cancercareontario.ca/sites/ccocancercare/files/guidelines/summary/pebc12-11s.pdf>.

11. Dobish R, Shultz J, Neilson S, Raven A, Chambers CR. Worksheets with embedded checklists support IV chemotherapy safer practice. *J Oncol Pharm Pract.* 2016;22(1):142-50. DOI:10.1177/1078155214556009
12. Gandhi S, Tyono I, Pasetka M, Trudeau M. Evaluating an oncology systemic therapy computerized physician order entry system using international guidelines. *J Oncol Pract.* 2014;10(2):e14-25. DOI:10.1200/JOP.2013.000914
13. Kukreti V, Cosby R, Cheung A, Lankshear S, ST Computerized Prescriber Order Entry Guideline Development Group. Computerized prescriber order entry in the outpatient oncology setting: from evidence to meaningful use. *Curr Oncol.* 2014;21(4):e604-12. DOI:10.3747/co.21.1990
14. Ortiz-Martin B, Pena-Cabia S. Degree of technological implementation in intravenous chemotherapy management in hospitals of the Autonomous Community of Madrid. *Farm Hosp.* 2017;41(4):488-96. DOI:10.7399/fh.2017.41.4.10729
15. Shulman LN, Miller RS, Ambinder EP, Yu PP, Cox JV. Principles of safe practice using an oncology EHR system for chemotherapy ordering, preparation, and administration, Part 2 of 2. *J Oncol Pract.* 2008;4(5):254-7. DOI:10.1200/JOP.0857501
16. Kullberg A, Larsen J, Sharp L. "Why is there another person's name on my infusion bag?" Patient safety in chemotherapy care - a review of the literature. *Eur J Oncol Nurs.* 2013;17(2):228-35. DOI:10.1016/j.ejon.2012.07.005
17. Bubalo J, Warden BA, Wiegell JJ, Nishida T, Handel E, Svoboda LM, et al. Does applying technology throughout the medication use process improve patient safety with antineoplastics? *J Oncol Pharm Pract.* 2014;20(6):445-60. DOI:10.1177/1078155213514469
18. Casiraghi A, Franzè S, Rocco P, Minghetti P. Risk management of in-hospital administration of anticancer drugs: impact of Raccomandazione 14 from the Italian Ministry of Health. *Tumori.* 2016;102(Suppl. 1):2-6. DOI:10.5301/tj.5000538
19. Carrington C, Stone L, Koczwara B, Searle C, Siderov J, Stevenson B, et al. The Clinical Oncological Society of Australia (COSA) guidelines for the safe prescribing, dispensing and administration of cancer chemotherapy. *Asia Pac J Clin Oncol.* 2010;6(3):220-37. DOI:10.1111/j.1743-7563.2010.01321.x
20. Leung M, Bland R, Baldassarre F, Green E, Kaizer L, Hertz S, et al. Safe Administration of Systemic Cancer Therapy: Introduction and General Methods 2012 [cited 2018 April 11]. Available at: <https://www.cancercareontario.ca/sites/ccocancercare/files/guidelines/full/pebc12-12f.pdf>.
21. Leung M, Bland R, Baldassarre F, Green E, Kaizer L, Hertz S, et al. Safe Administration of Systemic Cancer Therapy. Part 1: Safety During Chemotherapy Ordering, Transcribing, Dispensing, and Patient Identification 2012 [cited 2018 April 11]. Available at: <https://www.cancercareontario.ca/sites/ccocancercare/files/guidelines/summary/pebc12-12-1s.pdf>.
22. Leung M, Bland R, Baldassarre F, Green E, Kaizer L, Hertz S, et al. Safe Administration of Systemic Cancer Therapy. Part 2: Administration of Chemotherapy and Management of Preventable Adverse Events 2014 [cited 2018 April 11]. Available at: <https://www.cancercareontario.ca/sites/ccocancercare/files/guidelines/summary/pebc12-12-2s.pdf>.
23. Scottish Government. Guidance for the safe delivery of systemic anti-cancer therapy 2012 [cited 2018 April 11]. Available at: http://www.sehd.scot.nhs.uk/mels/CEL2012_30.pdf.
24. Neuss MN, Gilmore TR, Belderson KM, Billett AL, Conti-Kalchik T, Harvet BE, et al. 2016 updated American Society of Clinical Oncology/Oncology Nursing Society chemotherapy administration safety standards, including standards for pediatric oncology. *Oncol Nurs Forum.* 2017;44(1):31-43. DOI:10.1188/17ONF.31-43
25. Neuss MN, Polovich M, McNiff K, Esper P, Gilmore TR, LeFebvre KB, et al. 2013 updated American Society of Clinical Oncology/Oncology Nursing Society chemotherapy administration safety standards including standards for the safe administration and management of oral chemotherapy. *J Oncol Pract.* 2013;9(2 Suppl):5s-13s. DOI:10.1200/JOP.2013.000874
26. Jacobson JO, Polovich M, McNiff KK, Lefebvre KB, Cummings C, Galio M, et al. American Society of Clinical Oncology/Oncology Nursing Society chemotherapy administration safety standards. *Oncol Nurs Forum.* 2009;36(6):651-8. DOI:10.1188/09ONF.651-658
27. Goldspiel B, Hoffman JM, Griffith NL, Goodin S, DeChristoforo R, Montello CM, et al. ASHP guidelines on preventing medication errors with chemotherapy and biotherapy. *Am J Health Syst Pharm.* 2015;72(8):e6-e35. DOI:10.2146/sp150001
28. Greenall J, Shastay A, Vaida AJ, U D, Johnson PE, O'leary J, et al. Establishing an international baseline for medication safety in oncology: Findings from the 2012 ISMP International Medication Safety Self Assessment(R) for Oncology. *J Oncol Pharm Pract.* 2015;21(1):26-35. DOI:10.1177/1078155214556522
29. ISMP Canada. ISMP International Medication Safety Self Assessment for Oncology 2012 [cited 2018 April 11]. Available at: https://mssa.ismp-canada.org/data/oncology/mssa_oncology.pdf.
30. Gilmore TR, Schulmeister L, Jacobson JO. Quality Oncology Practice Initiative Certification Program: Measuring implementation of chemotherapy administration safety standards in the outpatient oncology setting. *J Oncol Pract.* 2013;9(2 Suppl):14s-8s. DOI:10.1200/JOP.2013.000886
31. Griffin MC, Gilbert RE, Broadfield LH, Easty AE, Trbovich PL, Griffin MC, et al. ReCAP: Comparison of independent error checks for oral versus intravenous chemotherapy. *J Oncol Pract.* 2016;12(2):168-9; e80-7. DOI:10.1200/JOP.2015.005892
32. Ribed A, Escudero-Vilaplana V, Romero-Jiménez RM, Iglesias-Peinado I, Herranz-Alonso A, Sanjurjo-Séiz M. Guiding pharmacist clinical interviews: a safety tool to support the education of patients treated with oral antineoplastic agents. *Expert Opin Drug Saf.* 2016;15(4):427-35. DOI:10.1517/14740338.2016.1150998
33. Lester J. Safe handling and administration considerations of oral anticancer agents in the clinical and home setting. *Clin J Oncol Nurs.* 2012;16(6):E192-7. DOI:10.1188/12.CJON.E192-E197
34. Goodin S, Griffith N, Chen B, Chuk K, Daouphars M, Doreau C, et al. Safe handling of oral chemotherapeutic agents in clinical practice: Recommendations from an international pharmacy panel. *J Oncol Pract.* 2011;7(1):7-12. DOI:10.1200/JOP.2011.7.1.e7
35. Rudnitzki T, McMahon D. Oral agents for cancer: safety challenges and recommendations. *Clin J Oncol Nurs.* 2015;19(3 Suppl):41-6. DOI:10.1188/15.S1.CJON.41-46
36. Grupo de Farmacia Oncológica de la SEFH. Plan estratégico de atención farmacéutica al paciente oncohematológico 2016 [cited 2018 April 11]. Available at: <http://gruposdetrabaja.sefh.es/gedefo/images/stories/documentos/2016/plan%20estrategico%202020.pdf>.
37. Arcusa Lanza A, León Carbonero AI, Vera García R, Juan Vidal OJ, Del Barco Berrón S, Guillot Morales M, et al. Hospitales de día en Oncología. Jara Sánchez C, Ayala de la Peña F, Virizuela JA, editors: Sociedad Española de Oncología Médica; 2015.
38. Jara C, Ayala F, Virizuela JA, Oncology Day Hospital Task Force. The oncology day hospital in Spain: An updated analysis of Spanish Society of Medical Oncology (SEOM) looking forward. *Clin Transl Oncol.* 2017;19(3):269-72. DOI:10.1007/s12094-016-1610-1
39. Jacobson JO, Polovich M, Gilmore TR, Schulmeister L, Esper P, Lefebvre KB, et al. Revisions to the 2009 American Society of Clinical Oncology/Oncology Nursing Society chemotherapy administration safety standards: Expanding the scope to include inpatient settings. *J Oncol Pract.* 2012;8(1):2-6. DOI:10.1200/JOP.2011.000339
40. North Wales Cancer Network. Standards for the safe use of oral anticancer medicines 2008 [cited 2018 April 11]. Available at: <http://www.wales.nhs.uk/sites3/docopen.cfm?orgid=456&id=99534>.

ANEX 1

Grupo de Trabajo SEFH-SEEO-SEOM para la seguridad del paciente oncológico

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