



REVIEW

Review of the Stability of Photosensitive Medications[☆]

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KEYWORDS

Stability;
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Review

Abstract

Objectives: Identify the photosensitive drugs included in the hospital pharmacotherapeutic guide and search for stability data on the storage, reconstitution, and dilution of these compounds.

Methods: The data were obtained by referencing technical specifications, information provided by drug laboratories, and in some cases, we performed a more extensive bibliographic search (tertiary sources and conference lectures) for each particular medication. We also performed a data search on the PubMed information database (from 2004 to 2009).

The drugs were placed in alphabetical order by brand since the stability of each drug when exposed to light does not depend exclusively on the primary active ingredient. Eight columns describe the principal characteristics of the drugs: brand name, active ingredient, laboratory, storage, reconstitution and dilution conditions, observations, and references.

Results: The listing comprised of 139 of the 1954 photosensitive medicines included in the pharmacotherapeutical guide (Table 1).

Conclusions: The lack of studies published on the stability of photosensitive medications provided the need for an internal review at our hospital.

It is important for drug-producing laboratories to perform photosensitivity tests on their products, with the results presented in the technical specifications in order to provide more accessible and reliable information. We believe that this should be required by law.

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PALABRAS CLAVE

Estabilidad;
Medicamentos
fotosensibles;
Revisión

Revisión de la estabilidad de los medicamentos fotosensibles

Resumen

Objetivo: Identificar los medicamentos fotosensibles incluidos en la guía farmacoterapéutica del hospital y realizar una búsqueda de datos de estabilidad durante el almacenamiento, reconstitución y dilución de los mismos.

Método: La búsqueda de datos fue a través de las fichas técnicas, información aportada por los laboratorios fabricantes y en algunos casos se recurrió a una búsqueda bibliográfica más extensa (fuentes terciarias y comunicaciones a congresos) que se especifica junto a cada medicamento. También se realizó una búsqueda en la base informática Pubmed (del 2004 al 2009).

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Los medicamentos han sido ordenados alfabéticamente por marca comercial ya que la estabilidad frente a la luz no depende exclusivamente del principio activo. Ocho columnas describen las características principales: nombre comercial, principio activo, laboratorio, condiciones de almacenamiento, reconstituido y diluido, observaciones y bibliografía.

Resultados: El listado recoge 139 especialidades farmacéuticas fotosensibles, de las 1954 especialidades incluidas en la GFT (tabla 1).

Conclusiones: La carencia de estudios publicados sobre estabilidad de medicamentos fotosensibles, planteó la necesidad de realizar una revisión interna en nuestro hospital.

Es importante que los laboratorios realicen estudios de fotosensibilidad de sus productos y los resultados consten en la fichas técnicas, para así disponer de información más accesible y fiable y para ello resaltamos la necesidad de que la ley lo exija.

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Introduction

It is essential that drugs are stored adequately so that they maintain their physical, chemical and pharmacological properties, especially if they need to be kept under special conditions. The main objective is to ensure that medication efficacy is maintained and safety improved, since if conditions are not adequate, the medication's potency could be reduced (e.g. cefotaxime, nitroprusside), as well as changes in safety due to the degradation product toxicity (e.g. tetracyclines).^{1,2} Photosensitive medications are a group of drugs that need to be protected from light. There are very few studies on this matter but they report that information regarding the drugs' light sensitivity often appears on the product's leaflet or summary of characteristics, although it does not appear on the box. All photosensitive medications should be packaged appropriately (protected from light) in the pharmacy department or in any other hospital unit so that they are not affected by light. In many cases, the pharmaceutical industry packages them in amber glass vials to protect them from the light. If not, they must always be kept inside the original packaging or wrapped in aluminium foil or any type of opaque paper.³ These medications must not come into contact with light from the moment they are manufactured until they are used.

We should therefore take the following points into account⁴:

They must only be taken out of the protective packaging when they are administered.

They should be reconstituted and administered immediately before they are used.

When they have been exposed to light for some time, their stability should be checked before use.

When they present any type of alteration concerning external appearance (colour change, cloudiness, precipitate formation in liquid forms) they should not be used until stability has been assessed. If necessary, they should be disposed of even if the expiry date has not been reached.

It is important to understand the stability of these type of drugs in order to dispose them, because poor storage would incur significant financial losses.

Given that there is very little data on photosensitive drugs, the aim of this study is to find out which medications need to be protected from light during storage and/or administration, and for how long they remain stable when exposed to light.

Materials and Methods

By reviewing each medication's summary of characteristics, we identified the photosensitive medications listed in the hospital's pharmacotherapeutic guide (PTG). We then performed a search on their stability characteristics for each of the pharmaceutical products, given that the photosensitive stability may not exclusively depend on the active ingredient (it may affect the pharmaceutical form, excipients, etc.)

We designed a table placing the drugs in alphabetical order by brand, consisting of eight columns which describe their main characteristics:

Brand name;

Active ingredient;

Laboratory;

Storage: the storage conditions of the drug before being used, i.e. since it is received until it is prepared for administration;

Reconstitution: the stability conditions that should be maintained while the drug is being reconstituted;

Dilution/administration: the stability conditions that should be maintained while the drug is diluted (and administered);

Observations: aspects that should especially be taken into consideration for this drug (change in colour, cloudiness, etc.);

References.

For cases where data were not available, we (Pharmacy Department) decided whether the drug should be protected from the light or not, based on the drug-use characteristics in the hospital (administration times, route, etc.). These cases have been identified using two asterisks (**).

"Not applicable" is used for drugs that do not require dilution and/or reconstitution.

The first source of information was the drug's summary of characteristics. When it lacked information, we contacted

Table 1 Review of Photosensitive Drugs.

Brand Name	Active Ingredient	Laboratory	Storage	Reconstitution	Dilution	Observ.	Ref.
ÁC. ASCÓRBICO® (amp)	Vitamin C	Bayer	PFL (it loses 50–60% of its activity in 24 h)	Not applicable	No need to PFL ^a (administer immediately)	Slight colouration does not imply activity alteration	5, 6
ACICLOVIR COMBINO PHARM® (caps/tab)	Acyclovir	Combino Pharm, S.L.	PFL (should be stored in light-resistant packages, 15–25%)	Not applicable	Not applicable	-	7, 8
ACTOCORTINA® (vial)	Hydrocortisone sodium phosphate	Nycomed Pharma	PFL	No need to PFL ^a (administer immediately)	No need to PFL	-	8
ACTRAPID® (vial)	Insulin	Novo Nordisk A/S	PFL	Not applicable	PFL ^a (administer immediately)	-	7
ADRENALINA® (img/ml amp)	Epinephrine	Braun	PFL (cover amp despite it being opaque)	Not applicable	No need to PFL	Dispose of if yellowish in colour (it darkens with oxidation)	8
ADRIAMICINA® (vial)	Doxorubicin or adriamycin	TEDEC MEIJI FARMA	PFL	No need to PFL ^a (stable 24 h)	No need to PFL ^a	Not applicable	7
AGASTRAT® (sol/perf)	Tirofiban	Merck Sharp & Dohme de España, S.A.	PFL	Not applicable	PFL ^a (administer immediately)	-	7
AKINETON® (amp)	Biperiden lactate	DESMA LABORATORIO FARMACÉUTICO, S.L.	PFL	Not applicable	Not applicable	-	9
AMERIDE® (tab)	Amiloride hydrochlorothiazide	Bristol-Myers Squibb	PFL	Not applicable	Not applicable	-	7
ANAFRANIL® (amp)	Clomipramine	Novartis Farmacéutica	PFL	Not applicable	PFL ^a (administer immediately)	-	7
ARANESP® (syr)	Darbepoetin alpha	Amgen Europe B.V.	PFL (stable for 72 h under artificial light – not stable under sunlight)	Not applicable	Not applicable	Do not use if cloudy or has particles	7, 9
AVASTÍN® (vial)	Bevacizumab	Roche Farma S.A	PFL	Not applicable	No need to PFL	-	7
BCNU® (amp)	Carmustine	Bristol-Myers Squibb S.A.	PFL	PFL (stable 7 days)	No need to PFL ^a	-	12, 13, 14, 15
BESILATO DE ATRACURIO® (amp)	Atracurium besylate	Inibsa	PFL	Not applicable	Stable in daylight at concentration of 0.5 mg/ml (no more than 30 °C)	-	8

					<i>Stability data:</i>		
					-4 h in sodium lactate compound IV perfusion		
					-8 h in Ringer's injection; 5% (w/v) IV glucose perfusion; 0.18% (w/v) IV sodium chloride solution and 4% (w/v) IV glucose perfusion		
					Up to 24 h in sodium chloride IV perfusion		
BLEOMICINA® (vial)	Bleomycin	Almirall Merck	PFL ^a	PFL ^a	PFL ^a	-	7
BUSCAPINA® (tab)	Butylscopolamine	Boehring Ingelheim	PFL	Not applicable	Not applicable	-	8
BUSCAPINA® (amp)	Butylscopolamine bromide	Boehring Ingelheim	PFL	Not applicable	Not applicable	-	8
CAELYX® (20 mg/(vial))	Liposomal doxorubicin	Schering Plough	PFL ^a	Not applicable	No need to PFL ^a	-	7
CEFOTAXIMA® (vial)	Cefotaxime	GES	PFL	No need to PFL ^a (administer immediately)	No need to PFL ^a (administer immediately)	Decolouration reduces drug's potency	7, 8, 10
CEFUROXIMA® (vial)	Cefuroxime	Normon	PFL	No need to PFL ^a (administer immediately)	No need to PFL ^a (administer immediately)	Increased colour intensity does not affect potency	8
CEFTAZIDIMA® (vial)	Ceftazidime	Normon	PFL	No need to PFL	No need to PFL ^a (administer immediately)	Colour becomes more intense with exposure to sunlight, but it can be used	8
CEMIDON® (amp)	Isoniazid	Chiesi-España	PFL	Not applicable	PFL	-	7
CIS-PLATINO® (vial)	Cisplatin	Ferrer Farma	PFL	Not applicable	PFL	-	12
COSMEGEN®	Dactinomycin	WAAS-ANITA S.A.	PFL	No need to PFL ^a	No need to PFL ^a	-	7
DACARBAZINA® (amp)	Dacarbazine	Medac	PFL	PFL	PFL	-	1, 7, 13, 14
DAUNOBLASTINA® (vial)	Daunorubicin	Pfizer	PFL	PFL	No need to PFL ^a	-	12, 14, 15
DAUNOXOME® (vial)	Liposomal doxorubicin	Gilead Sciences S.L	PFL	Not applicable	PFL	-	5, 14
DIABINESE® (tab)	Chlorpropamide	Famasierra Laboratories	PFL	Not applicable	Not applicable	-	11
DIGOXINA® (amp)	Digoxin	Teofarma	PFL	Not applicable	No need to PFL ^a (administer immediately)	-	5

Table 1 (Continued)

Brand Name	Active Ingredient	Laboratory	Storage	Reconstitution	Dilution	Observ.	Ref.
DISTRANEURINE® (caps)	Clomethiazole	Astra-Zeneca	PFL	Not applicable	Not applicable	-	9
DOBUTAMINA HOSPIRA® (vial)	Dobutamine	Hospira	PFL	Not applicable	Not applicable	-	7
DOBUTAMINA INIBSA® (vial)	Dobutamine	Inibsa	PFL	Not applicable	No need to PFL ^a (administer immediately)	- Pink colouration does not imply activity alteration - Use within 24 h	7, 8, 9
DOLANTINA® (amp)	Meperidine	Kernpharma	PFL	Not applicable	No need to PFL (stable for 12 weeks)	-	5
DOPAMINA® (amp)	Dopamine	GRIFOLS	PFL	Not applicable	No need to PFL	- Dispose if colouration - Stable 36 h under light - Stable for a min. 24 h following dilution	8
ELOXATIN® (vial)	Oxaliplatin	Sanofi-Aventis	PFL	Not applicable	No need to PFL	-	7
ENISON® (vial)	Vindesine	STADA	PFL	PFL	No need to PFL ^a	-	7
ESMERON® (vial)	Rocuronium bromide	Organon	PFL	Not applicable	PFL	-	8
ESTRACYT® (vial)	Streptomycin	Pfizer	PFL	PFL ^a	No need to PFL ^a	-	7
EUFILINA® (amp)	Aminophylline	Nycomed Pharma	PFL	Not applicable	No need to PFL	-	7, 8
FARMORUBICINA® (amp)	Epirubicin	Pfizer	PFL	Not applicable	No need to PFL	-	12, 14, 15
FENITOÍNA® (caps/susp)	Phenytoin	Combino-Pharm	PFL	Not applicable	Not applicable	-	7, 8
FENTANEST® (amp)	Fentanyl	Kernpharma	PFL	Not applicable	No need to PFL	-	5
FLUOROURACILO® (vial)	5-Fluorouracil	Ferrer Farma	PFL	Not applicable	PFL	-	12, 13, 14, 15
FOLINATO CÁLCICO GES® (amp)	Calcium folinate	GES	PFL	No need to PFL ^a (administer immediately)	No need to PFL ^a (administer immediately)	-	7
FUNGIZONA® (vial)	Amphotericin B	Bristol Myers Squibb	PFL	No need to PFL ^a (administer immediately)	No need to PFL	-	7
FUROSEMIDA INIBSA® (amp)	Furosemide	Inibsa	PFL	Not applicable	PFL	Yellowish colour indicates instability	5, 8
GENOXAL® (amp)	Cyclophosphamide	Baxter Oncology	PFL	PFL ^a	No need to PFL ^a	-	7
HALOPERIDOL ESTEVE® (amp)	Haloperidol	Esteve	PFL (stable for 8 h under light)	Not applicable	PFL	-	8

HALOPERIDOL PRODES® (tab)	Haloperidol	Prodes	PFL	Not applicable	Not applicable	-	7
HYDRAPRES® (tab/amp)	Hydralazine	Rubio	PFL	No need to PFL ^a (administer immediately)	PFL	-	5, 7
HYCANTIN® (vial)	Topotecan	GlaxoSmithKline S.A.	PFL	PFL ^a	No need to PFL	-	7
IMIGRAN® (amp/tab)	Sumatriptan	GlaxoSmithKline S.A.	PFL	Not applicable	Not applicable	-	7
IMUREL® (tab)	Azathioprine	Ucb Pharma S.A.	PFL	Not applicable	Not applicable	-	7
ESTRACYT® (vial)	Streptomycin	Pfizer	PFL	PFL ^a	No need to PFL ^a	-	7
EUFILINA® (amp)	Aminophylline	Nycomed Pharma	PFL	Not applicable	No need to PFL	-	7, 8
FARMORUBICINA® (amp)	Epirubicin	Pfizer	PFL	Not applicable	No need to PFL	-	12, 14, 15
FENITOÍNA® (caps/susp)	Phenytoin	Combino-Pharm	PFL	Not applicable	Not applicable	-	7, 8
FENTANEST® (amp)	Fentanyl	Kernpharma	PFL	Not applicable	No need to PFL	-	5
FLUOROURACILO® (vial)	5-Fluorouracil	Ferrer Farma	PFL	Not applicable	PFL	-	12, 13, 14, 15
FOLINATO CÁLCICO GES® (amp)	Calcium folinate	GES	PFL	No need to PFL ^a (administer immediately)	No need to PFL ^a (administer immediately)	-	7
FUNGIZONA® (vial)	Amphotericin B	Bristol Myers Squibb	PFL	No need to PFL ^a (administer immediately)	No need to PFL	-	7
FUROSEMIDA INIBSA® (amp)	Furosemide	Inibsa	PFL	Not applicable	PFL	Yellowish colour indicates instability	5, 8
GENOXAL® (amp)	Cyclophosphamide	Baxter Oncology	PFL	PFL ^a	No need to PFL ^a	-	7
HALOPERIDOL ESTEVE® (amp)	Haloperidol	Esteve	PFL (stable for 8 h under light)	Not applicable	PFL	-	8
HALOPERIDOL PRODES® (tab)	Haloperidol	Prodes	PFL	Not applicable	Not applicable	-	7
HYDRAPRES® (tab/amp)	Hydralazine	Rubio	PFL	No need to PFL ^a (administer immediately)	PFL	-	5, 7
HYCANTIN® (vial)	Topotecan	GlaxoSmithKline S.A.	PFL	PFL ^a	No need to PFL	-	7
IMIGRAN® (amp/tab)	Sumatriptan	GlaxoSmithKline S.A.	PFL	Not applicable	Not applicable	-	7
IMUREL® (tab)	Azathioprine	Ucb Pharma S.A.	PFL	Not applicable	Not applicable	-	7
INIBSACAIN EPINEFRINA® (amp)	Bupivacaine + epinephrine	Inibsa	PFL	Not applicable	Not applicable	- Turns brownish colour when it becomes unstable	7, 8

Table 1 (Continued)

Brand Name	Active Ingredient	Laboratory	Storage	Reconstitution	Dilution	Observ.	Ref.
INMUCYST BCG® (inj)	<i>Mycobacterium bovis</i>	Aventis	PFL	PFL	No need to PFL ^a	- Epinephrine is sensitive to light	7
INSULATARD® (vial)	Isophane insulin	Novo Nordisk A/S	PFL	Not applicable	PFL ^a (administer immediately)	-	7
IRINOTECAN® (vial)	Irinotecan	Hospira	PFL	Not applicable	No need to PFL	-	12, 14, 16
HUMALOG® (pen/vial)	Insulin lispro	Eli Lilly Netherland B.V.	PFL	Not applicable	PFL ^a (administer immediately)	-	7
KETOLAR® (amp)	Ketamine	Parke Davis	PFL	Not applicable	No need to PFL ^a (administer immediately)	It may go darker but this does not affect its potency	7, 9
KONAKION® (amp)	Phytonadione	Roche Pharma	PFL	Not applicable	Not applicable	-	6, 7
LANTUS (vial/pen)	Insulin glargine	Sanofi Aventis Deutschland GMBH	PFL	Not applicable	PFL ^a (administer immediately)	-	7
LEDERFOLÍN® (tab)	Calcium folinate	Wyeth Farma	PFL	PFL	PFL	-	7, 9
LOSEC® (vial)	Omeprazole	Astra-Zeneca	PFL (stable under light for 24h)	Not applicable	PFL	- Should not be kept under normal light conditions for more than 24 h - Solution can be handled under normal light conditions without special precaution	7, 8
MAB-CAMPATH® (vial)	Alemtuzumab	Quimica Farmabayer	PFL	Not applicable	No need to PFL	-	7
MELFALAN® (vial)	Melphalan	GlaxoSmithKline	PFL	PFL	No need to PFL	Immediate use	7
METOTREXATO® (vial)	Methotrexate	Merck Genéricos	PFL	Not applicable	PFL	0.1 mg/ml sol. loses 5-8% stability in 10 days and 11-17% in 20 days, if exposed to light	8
MIDAZOLAM COMBINOPHARM® (amp)	Midazolam	Combino-Pharm	PFL	Not applicable	Not applicable	-	7, 8
MIDAZOLAM NORMON® (amp)	Midazolam	NORMON	PFL	Not applicable	Not applicable	-	8, 10
MIDAZOLAM GES® (amp)	Midazolam	GES	PFL	Not applicable	Not applicable	Precipitate dissolves when shaken	7, 8, 9, 10

MITOMYCINA – C [®] (vial)	Mitomycin	Inibsa	PFL	PFL (dispose of after 12 h if not used)	PFL	Solutions should be used immediately (especially if contain dextrose)	5, 8, 15
MIXTARD [®] (pen)	Insulin + isophane insulin	Novo Nordisk Pharma, S.A.	PFL	Not applicable	PFL ^a (administer immediately)	-	7
MOLSIDAIN [®] (tab)	Molsidomine	Sanofi-Aventis	PFL	Not applicable	Not applicable	-	8
MORFINA [®] 1% (amp)	Morphine	Braun	PFL	Not applicable	No need to PFL	-	7, 8
MUSTOFORÁN [®] (vial)	FOTEMUSTINE	Italfarmaco S.A	PFL	PFL	PFL	-	7
MYLOTARG [®] (vial)	Gemtuzumab ozogamicin	Wyeth Farma S.A	PFL	PFL	No need to PFL ^a	-	7
MYOCET [®] 50 mg/(vial)	Doxorubicin liposomes	Cephalon Pharma SLV	PFL	Not applicable	No need to PFL ^a	-	8
NALOXONE [®] (amp)	Naloxone	Abello	PFL	Not applicable	PFL	-	5, 7
NAVELBINE [®] (amp)	Vinorelbine	Pierre Fabre Iberica	PFL	Not applicable	No need to PFL ^a	-	7
NAVELBINE [®] (tab)	Vinorelbine	Pierre Fabre Iberica	PFL	Not applicable	Not applicable	-	7
NEXIUM MUPS [®] (vial)	Esomeprazole	ASTRA ZENECA	PFL (stability under artificial light for 24 h)	No need to PFL	No need to PFL	-	7, 8
NIMBEX [®] (amp)	Cisatracurium besylate	GlaxoSmithKline	PFL	Not applicable	No need to PFL (we do not recommend administration for more than 1 week)	- There are no studies under sunlight - No external indication to show loss of stability	7, 8
NIPENT [®] (vial)	Pentostatin	Hospira	PFL ^a	PFL	PFL ^a	-	7
NITROPRUSIATO [®] (inj)	Nitroprusside	Rotta Pharm	PFL	PFL (stability 24 h)	PFL. Stability at 4 h of light (degrades $\geq 20\%$). 24 h stability protected from light	- Dispose of if strong dark orange, dark brown or blue - Do not administer if cloudy or precipitate	6
NORCURON [®] (amp)	Vecuronium	Organon NU	PFL	No need to PFL (stability exposed to light for 24 h)	No need to PFL (stability exposed to light for 24 h)	Although unused should be disposed of due to risk of contamination	7

Table 1 (Continued)

Brand Name	Active Ingredient	Laboratory	Storage	Reconstitution	Dilution	Observ.	Ref.
NOVANTRONE® (vial)	Mitoxantrone	Ferrer Farma	PFL ^a	PFL ^a	PFL ^a	-	7
NUVACTHEN DEPOT® (amp)	Tetracosactide	Padro SA	PFL	Not applicable	Not applicable	-	6
OMEPRAZOL® (caps)	Omeprazole	Normon	PFL	Not applicable	No need to PFL	For NGP, open caps and disperse in acid medium	8
OMNIPAQUE® (sol inj)	Iohexol	GES	PFL	Not applicable	No need to PFL ^a (administer immediately)	-	7, 8
PARLODEL® (tab)	Bromocriptine mesylate	Meda Pharma	PFL	Not applicable	Not applicable	-	7
PREDNISONA® (tab)	Prednisone	Sanofi-Aventis	PFL	Not applicable	Not applicable	-	8
PRIMPERAN® (amp)	Metoclopramide	Sanofi-Aventis	PFL	Not applicable	No need to PFL	-	6, 7
PROLEUKIN® (vial)	Aldesleukin	Chiron Iberia S.A	PFL	PFL	No need to PFL ^a (administer immediately)	-	5, 7
PROPOFOL® (amp)	Propofol	Mayne	PFL	Not applicable	No need to PFL ^a (administer immediately)	-	7
RANITIDINA® (tab)	Ranitidine	Normon	PFL	Not applicable	No need to PFL	Administer via NGP, crushed and diluted in water	8, 10
RANITIDINA® (amp)	Ranitidine	Normon	PFL (remains stable for max. 15 days under light)	Not applicable	No need to PFL	Colouration does not modify activity	7, 8
RIVOTRIL® (amp/tab/drp)	Clonazepam	Davis medica	PFL	Not applicable	No need to PFL (remains stable for 48 h exposed to light)	-	6, 7
SANDOSTATIN® (amp)	Octreotide	Novartis Farmaceutica	PFL	Not applicable	No need to PFL ^a (administer immediately)	-	7, 9
SEGURIL® (tab)	Furosemide	Sanofi-Aventis	PFL	Not applicable	Not applicable	-	7
SINOGAN® (drp)	Levomepromazine	Sanofi-Aventis	PFL	Not applicable	Not applicable	-	7, 8
SINOGAN® (amp)	Levomepromazine	Sanofi-Aventis	PFL	Not applicable	Not applicable	-	6, 7, 8
SOLINITRINA® FORTE (amp)	Nitroglycerin	Almirall-Prodesfarma	No need to PFL	Not applicable	PFL if exceeds 2 h in infusion	More diluted, more unstable	7, 9
SOLTRIM® (amp)	Trimethoprim-sulfamethoxazole	Almirall-Prodesfarma	PFL	PFL ^a	PFL if exceeds 2 h in infusion	More diluted, more unstable	9
SOMATOSTATINA NORMON® (vial)	Somatostatin	Normon	PFL ^a (administer immediately)	PFL	PFL	-	7

SOMATOSTATINA COMBINO – PHARM® (vial)	Somatostatin	Combino-Pharm	No need to PFL	PFL	PFL	-	7, 8
SUMIAL® (amp/tab)	Propranolol	Astra-Zeneca	PFL	Not applicable	No need to PFL	- Do not administer amp if colouration or cloudiness present - Tablets can be administered by NGP, but used as soon as possible	6, 7, 8
SYNACTHEN® (amp)	Tetracosactide	Novartis Farmaceutica	PFL	Not applicable	Not applicable	-	7
SYNTOCINON® (amp)	Oxytocin	Defiante Farmaceutica LDA	PFL	Not applicable	No need to PFL ^a (administer immediately)	-	7
TAXOL® (vial)	Paclitaxel	Brystol Myers Squibb	PFL	Not applicable	No need to PFL ^a	-	
TAXOTERE® (vial)	Docetaxel	Sanofi-Aventis	PFL	PFL ^a	No need to PFL	-	
TIOTEPA® (vial)	Thiotepa	Irinol Farma S.A	PFL	Not applicable	No need to PFL ^a	-	
TOMUDEX® (vial)	Raltitrexed	Hospira	PFL	PFL	No need to PL	-	7
TORISEL® (vial)	Temsirolimus	Wyeth Farma S.A	PFL	PFL ^a	PFL	-	7
TRANDATE® (amp)	Labetalol	Kern Pharma S.L	PFL	Not applicable	No need to PFL ^a (administer immediately)	-	7
TRANGOREX® (amp)	Amiodarone	SANOFI-AVENTIS S.A	PFL	Not applicable	PFL	When it degrades iodine is released, changing its colour	7, 8
TRIGÓN DEPOT® (amp)	Triamcinolone	Bristol Myers Squibb	PFL	Not applicable	Not applicable	-	7

Table 1 (Continued)

Brand Name	Active Ingredient	Laboratory	Storage	Reconstitution	Dilution	Observ.	Ref.
TRONOXAL® (amp)	Ifosfamide	BAXTER	PFL	PFL	PFL	-	5, 6
TUBERCULINA PRD RT 23® (vial)	Tuberculin (tuberculosis test)	UCB Pharma	PFL	Not applicable	Not applicable	-	6, 7
URBASÓN® (amp)	Methylprednisolone	Sanofi-Aventis	PFL	No need to PFL ^a (administer immediately)	No need to PFL ^a (administer immediately)	-	6, 7
VELCADE® (vial)	Bortezomib	Janssen Cilag S.A.	PFL	PFL	No need to PFL ^a	-	7
VENTOLIN® (amp)	Salbutamol	GlaxoSmithKline	PFL	Not applicable	No need to PFL ^a (administer immediately)	-	6, 7
VEPESID® (vial)	Etoposide	Bristol Myers Squibb	PFL	Not applicable	PFL	-	14, 15
VIBRAVENOSA® (amp/caps)	Doxycycline	Pfizer	PFL	Not applicable	PFL	Solution darkens when it has degraded	6, 7
VINBLASTINA® (vial)	Vinblastine	Stada	PFL	PFL	PFL	-	12, 14, 15
VINCRISTINA® (vial)	Vincristine	Pfizer	PFL	Not applicable	PFL	-	12, 15
VISUDYNE® (amp)	Verteporfin	Novartis Europharm	PFL	PFL	PFL	-	6, 7
VOLTAREN® (amp)	Diclofenac	Novartis Farmaceutica	PFL	Not applicable	Not applicable	-	7
VUMON® (vial)	Teniposide	Bristol-Myers Squibb	PFL	Not applicable	No need to PFL ^a	-	5
ZAVEDOS® (vial)	Idarubicin	Pfizer	PFL	PFL	PFL	-	12, 14
ZOFRÁN® 4 mg and 8 mg (amp)	Ondansetron	GlaxoSmithKline, S.A	PFL	Not applicable	PFL (stable 7 days) under fluorescent light	PFL is recommended although there are studies in which it has maintained stable in light	6, 7, 8

amp: ampoules; Ref.: bibliographical references; caps: capsules; tab: tablets; drp: drops; inj: injectable; syr: syringe; Observ.: observations; per: perfusion; PFL: protect from light; sol: solution; susp: suspension; NGP: nasogastric probe.

^a There are no studies.

the laboratory by telephone, e-mail or fax. The information provided was limited since light-sensitivity testing is not mandatory in the Spanish law on guarantees and rational use of drugs and health products, 2006. We performed a bibliographical search using tertiary resources and conference lectures. We also performed a search on the PubMed database (2004–2009). To complete the study, we examined whether the drug's original packaging adequately protected them from the light.

Results

In this review, we listed 139 of the 1954 photosensitive drugs (Table 1) included in the PTG.

Data distribution obtained according to the information source was: 3.5% primary sources, 5.4% secondary sources, 19% tertiary sources, 19% information provided by laboratories and only 30.6% of data were obtained from the summary of product characteristics. Information about 22.5% was not found.

Most of the photosensitive medications reviewed in this study (73.4%) are received from industry in a package that does not adequately protect it from the light.

Conclusions and Discussion

It is important that laboratories perform light-sensitivity tests on their products and that the results are included on the summary of characteristics. This would make information more accessible and reliable, since drug stability is extremely important, which is why we believe that it should be required by law. The lack of studies published on stability of photosensitive drugs meant that we had to perform an internal review of the photosensitive medications included in our hospital's PTG.

This list has been included in the "*Manual de correcto almacenamiento y conservación de medicamentos en el Servicio de Farmacia*" (Manual of correct drug storage in the Pharmacy Department), and to ensure that photosensitive drugs are correctly stored in our storeroom, we have stuck stickers on the photosensitive ones. In addition, the other hospital units have been provided with the list, with the aim of promoting patient safety.

Conflict of Interest

The authors affirm that they have no conflicts of interest.

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