台灣病人安全通報系統(TPR)
警示訊息

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適用對象：所有醫療機構/所有醫療人員
撰稿人：外部專家撰稿
審稿專家：TPR 工作小組校修

預防高警訊藥品給藥錯誤

提醒

高警訊藥品醫令系統應有防錯機制 (如極量、限制途徑、高警訊藥品提示等)，給藥應有稽核機制 (如雙重核對或其他結合資訊系統方法)，以避此類藥品給藥錯誤。

案例描述

<案例一>

病人診斷肺炎，醫囑靜脈滴注N/S 1 Bot Keep 20CC/hr，因血液檢驗值鈉:129，臨時醫囑開立3%Nacl Keep 10ml/hr，護理師至病人單位掛上3%NACL調20CC/hr，17:30至單位探視發現流速設定錯誤。

<案例二>

病人行腸道手術後，因呼吸衰竭轉入加護病房，4/1血中磷數值為0.4，醫師開立Potassium Phosphate 滴注 1ml IVAQD，於4/2早上7:00護理師將Potassium Phosphate 20ml加大量點滴稀釋50ml持續滴注30分鐘，07:43心電圖監視警告鈴響，心電圖呈現Asystole。

<案例三>

病人診斷肺栓塞，醫囑靜脈滴注heparin 5000u in D5W 500ml 10ml/hr，Q6h check APTT值，因APTT檢驗值>100sec，醫師口頭指示流速調降2ml/hr，數小時後再驗APTT檢驗值仍>100sec，才發現流速設定成調增2ml/hr。

建議作法

1. 醫療機構可依據WHO與美國ISMP(Institute of Safety Medication Practices)(如表一、表二)，公布院內高警訊藥品 (High-Alert Medications) 類別及特定藥品品項，並列入定期檢討及公告醫療人員周知。
2. 醫療機構之藥品管理委員會 (Pharmacy & Therapeutics Committee) 或類似功能會議，應建立全院醫療人員需遵循之高警訊藥品管理規範，規範內容建議考慮：
   (1) 不應接受高警訊藥品之口頭醫囑。
   (2) 標準使用高警訊藥品劑量試算表。
   (3) 使用高警訊藥品治療疾病時，必須標準化檢驗參數變化值，如使用降血糖藥品前後的血糖變化。
   (4) 醫院可限制高警訊藥品配製濃度及劑型，如dopamine配製的上限濃度。
   (5) 高警訊藥品應獨立儲放，並依藥物種類、劑型分層分隔定點儲存及配送。
   (6) 藥師執行高警訊藥品醫囑核對、藥品配製濃度及稀釋液雙重確認，應有標準化流程。
   (7) 明訂高警訊藥品投藥前，護理人員的校對方式；若為連續輸注時，點滴幫浦設定及定時巡視核對之機制。
   (8) 建立高警訊藥品需暫停使用的指引，並提供過量使用藥物後的治療處理方式
   (9) 病房及藥劑部門應有定期查核高警訊藥品管理與使用正確性之機制。
3. 高警訊藥品在電子資訊系統設計：
   (1) 電子處方集、處方箋或藥袋應加註『高警訊』特殊標記或顏色，以供辨識。
   (2) 藥品外觀、包裝及藥名相似，或相同成分而不同劑型、規格、廠牌之藥品(Look-alike / sound-alike, LASA)應做特殊標記提醒，如：不同廠牌之藥名採大小寫方式區分、藥名採用Tall Man Letter、同成分兩種規格以上之藥品；在藥袋上將該藥品規格列印在藥品名稱之前，以利辨識。

(3) 電腦醫令系統對上限劑量及給藥途徑有自動偵測機制，不符上限劑量、給藥途徑或給藥方案時，限制醫囑開立。

(4) 醫師開立醫囑時、藥師配製藥物及護理人員執行給藥時，電子資訊能自動提示高警訊藥品作用及副作用之機制。

(5) 當醫囑有調整高警訊藥品時，護理資訊系統給藥時可同步自動提示藥物調整(時間)及調整基準訊息，如：輸注Heparin追蹤APTT >100sec。

(6) 採用智慧型輸注幫浦，可建立常用高警訊藥品種類，及依藥品種類注射使用上限劑量之功能。

4. 管路沖洗用之高警訊藥品，如：低濃度Heparin，建議採單一預充注射器；或改生理食鹽水溶液替代。

5. 建立醫療相關人員於藥品使用前，應熟悉其作用及副作用，以作為後續評估與追蹤依據。

6. 運用多元資訊管道將院內之用藥安全警訊提供醫療相關人員。

表一、急性照護機構高警訊藥物列表 (ISMP)

Classes/Categories of Medications	specific Medications
adrenergic agonists, IV (e.g., EPINEPHrine, phenylephrine, norepinephrine)	EPINEPHrine, subcutaneous
adrenergic antagonists, IV (e.g., propranolol, metoprolol, labetalol)	epoprostenol (e.g., Flolan), IV
anesthetic agents, general, inhaled and IV (e.g., propofol, ketamine)	insulin U-500 (special emphasis*)
antiarrhythmics, IV (e.g., lidocaine, amiodarone)	magnesium sulfate injection
antithrombotic agents, including: ● anticoagulants (e.g., warfarin, low molecular weight heparin, unfractionated heparin) ● direct oral anticoagulants and factor Xa inhibitors (e.g., dabigatran, rivaroxaban, apixaban, edoxaban, betrixaban, fondaparinux) ● direct thrombin inhibitors (e.g., argatroban, bivalirudin, dabigatran) ● glycoprotein IIb/IIIa inhibitors (e.g., eptifibatide) ● thrombolytics (e.g., alteplase, reteplase, tenecteplase)	methotrexate, oral, nononcologic use
	nitroprusside sodium for injection
	opium tincture
	oxytocin, IV
	potassium chloride for injection concentrate
	potassium phosphates injection
	promethazine injection

	vasopressin, IV and intraosseous
cardioplegic solutions	
chemotherapeutic agents, parenteral and oral	
dextrose, hypertonic, 20% or greater	
dialysis solutions, peritoneal and hemodialysis	
epidural or intrathecal medications	
inotropic medications, IV (e.g., digoxin, milrinone)	
insulin, subcutaneous and IV	
liposomal forms of drugs (e.g., liposomal amphotericin B) and conventional counterparts (e.g., amphotericin B desoxycholate)	
moderate sedation agents, IV (e.g., dexmedetomidine, midazolam, LORazepam)	
moderate and minimal sedation agents, oral, for children (e.g., chloral hydrate, midazolam, ketamine [using the parenteral form])	
opioids, including: ● IV ● oral (including liquid concentrates, immediate- and sustained-release formulations) ● transdermal	
neuromuscular blocking agents (e.g., succinylcholine, rocuronium, vecuronium)	
parenteral nutrition preparations	
sodium chloride for injection, hypertonic, greater than 0.9% concentration	
sterile water for injection, inhalation and irrigation (excluding pour bottles) in containers of 100 mL or more	
sulfonylurea hypoglycemics, oral (e.g., chlorproPAMIDE, glimepiride, glyBURIDE, glipiZIDE, TOLBUTamide)	

*All forms of insulin, subcutaneous and IV, are considered a class of high-alert medications.

Insulin U-500 has been singled out for special emphasis to bring attention to the need for distinct strategies to prevent the types of errors that occur with this concentrated form of insulin.

表二、長照機構高警訊藥物列表(ISMP)

Classes/Categories of Medications	specific Medications
anticoagulants, parenteral and oral*	digoxin, parenteral and oral
chemotherapeutic agents, parenteral and oral (excluding hormonal agents)	EPINEPHrine, parenteral
hypoglycemics, oral (including combination products with another drug)	iron dextran, parenteral
insulins, all formulations and strengths (e.g., U-100, U-200, U-300, U-500)	methotrexate, oral, non-oncology use **
parenteral nutrition preparations	concentrated morphine solution, oral ***
opioids - parenteral, transdermal, and oral (including liquid concentrates, immediate- and sustained-release formulations, and combination products with another drug)	

* including warfarin and newer agents.

** All forms of chemotherapy are considered a class of high-alert medications. Oral methotrexate for non-oncology purposes has been singled out for special emphasis to bring attention to the need for distinct strategies to prevent wrong frequency errors that occur with this drug when used for non-oncology purposes that can result in death.

*** All forms of opioids are considered a class of high-alert medications. Concentrated morphine solution has been singled out for special emphasis to bring attention to the need for distinct strategies to prevent wrong frequency errors that occur with this drug that can result in death.

參考資料

1. 李惠娟、高淑敏、林永順、葉鳳英、張慧真、周辰熹(2010)‧藥品警訊系統及處方評估訓練應用於新進藥師。*台灣醫學，14*(5)，479-483。
2. 吳祥鳳、于漱、藍雅慧、唐福瑩(2012)‧給藥錯誤事件綜論--急診室、加護中心、兒科病房。*護理雜誌，59*(2)，93-98。
3. 柳營奇美醫院藥劑部(2015年3月10日)‧高警訊藥品管理。取自於 http://www.chimei.org.tw/main/clh_department/75500/高警訊藥品管理辦法.pdf
4. 楊麗影(2007)‧實施高警訊藥物作業管理政策‧*源遠護理，1*(2)，30-41。
5. 醫策會(2012)‧用藥安全管控。取自於 http://www.tpr.org.tw/upload/site_content_article/63/201210171659490.pdf · PDF 檔案
6. Institute for Safe Medication Practices. (2018). *ISMP List of High-Alert Medications in Acute Care Settings*. Retrieved from https://www.ismp.org/sites/default/files/attachments/2018-08/highAlert2018-Acute-Final.pdf
7. Institute for Safe Medication Practices. (2017). *ISMP List of High-Alert*

Medications in Long-Term Care (LTC) Settings. Retrieved from https://www.ismp.org/sites/default/files/attachments/2017-11/LTC-High-Alert-List.pdf

8. Anderson. P., & Townsend. T. (2015). Preventing high-alert medication errors in hospital patients, *Am Nurs Today,10*(5), 18-23.
9. Institute for Healthcare Improvement. (2012). *How-to Guide: Prevent harm from high-alert medications.* Retrieved from http://www.ihi.org/resources/Pages/Tools/HowtoGuidePreventHarmfromHighAlertMedications.aspx