出國報告（類別：出席國際會議）

參加 2018 年美國醫療機構藥師學會 (ASHP) 綜合大會

出國報告

服務機關：臺北榮民總醫院藥學部
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摘要

2018 年美國醫療機構藥師學會 (American Society of Health-System Pharmacists, ASHP) 綜合大會 (Midyear Clinical Meeting & Exhibition) 在美國加州安那罕 (Anaheim, California) 會議中心舉辦，會期自 2018 年 12 月 2 日起為期 5 天，主題為「Some Midyear Magic」，期間計 175 場會議，邀請超過 500 名專家演講，內容多元、豐富且精彩。藥學部許家禎總藥師與楊子涵藥師應邀出席，發表「Prevalence and Clinical Consequences of Contraindicated Repaglinide-Gemfibrozil Interaction in an Ambulatory Setting」、「Multi-target Therapy of Cyclosporine and Mycophenolate mofetil for the Treatment of Lupus Nephritis in Patients with Systemic Lupus Erythematosus」兩篇壁報論文，會中分享工作心得並展示研究成果，藉此進行學術交流。參與此次會議可瞭解國際最新的醫院藥學發展狀況，無論是臨床藥物治療、藥品行政/管理、病人照護、醫療品質、教學/教育訓練，相關見聞將作為本部精進藥事作業之參考。感謝輔導會及院方全力支持，准以本部同仁前往參加，參與此次會議對同仁而言，不僅啟發藥學專業新思維與拓展視野，亦對本部未來實務服務及教學研究發展有益。建議院方每年補助本部藥師出國參加學術會議、建置會議/課程資訊 App，建議藥學部引進自動化設備 (如智慧藥櫃、機器手臂等) 輔助調劑、鼓勵藥師取得專科藥師認證、至藥學院系舉行徵才會以網羅人才。

關鍵字：美國醫療機構藥師學會 (American Society of Health-System Pharmacists, ASHP)

一、目的

美國醫療機構藥師學會 (American Society of Health-System Pharmacists, ASHP) 為全球最大、最具代表性的藥學專業學會，擁有超過 50,000 名會員。ASHP 每年舉辦各式專業會議與學術研討會，以綜合大會 (Midyear Clinical Meeting & Exhibition) 為最盛大，邀請國際藥學專家參與盛會及發表學術研究論文，並提供執業藥師、藥學生最新的專業資訊及實務指引，幫助藥學專業人員不斷提升藥學知識與技能、增強執業相關能力。

2018 年度 ASHP 綜合大會在美國加州安那罕 (Anaheim, California) 會議中心舉辦，會期自 2018 年 12 月 2 日起為期 5 天，主題為「Some Midyear Magic」(圖 1、圖 2)。與會藥師來自全球各地，人數超過 25,000 人，參與展覽廠商 350 家。期間計 175 場專題會議，邀請超過 500 名專家演講，內容多元、豐富且精彩。藥學部許家禎總藥師與楊子涵藥師應邀出席，發表「Prevalence and Clinical Consequences of Contraindicated Repaglinide-Gemfibrozil Interaction in an Ambulatory Setting」、「Multi-target Therapy of Cyclosporine and Mycophenolate mofetil for the Treatment of Lupus Nephritis in Patients with Systemic Lupus Erythematosus」兩篇壁報論文 (圖 3、圖 4、圖 5)，會中分享工作心得並展示研究成果，藉此進行學術交流。參與此次會議，不僅啟發藥學專業新思維與拓展視野，亦對本部未來實務服務及教學研究發展有益。

二、過程

本次 ASHP 年度綜合大會在美國加州安納罕會議中心舉辦，自 2018 年 12 月 2 日至 6 日，為期 5 天。會議議題包含醫院藥事作業等四大面向如藥事臨床服務模式、用藥安全、醫療資訊與藥事管理及最新藥學發展趨勢。

1. 開幕式

大會邀請魔術強森 (Earvin "Magic" Johnson) 進行人生經驗的分享，魔術強森奉獻十三年職業生涯給洛杉磯湖人隊，並於退休後成為一名成功的企業家，致力於倡導愛滋病的預防和安全性行為的重要性。演講過程中勉勵所有的藥師，要勇於追求夢想並提供高品質的服務給需要幫助的人，為社會做出貢獻。

2. 壁報發表

藥學部於本次年會發表 2 篇壁報論文 (圖 5、圖 6)，如下：

(1) 作者：Chia-Chen Hsu, Yi-Yen Chen, Yueh-Ching Chou, Chia-Lin Chou and Yuh-Lih Chang

篇名：Prevalence and clinical consequences of contraindicated Repaglinide-Gemfibrozil interaction in an ambulatory setting

(2) 作者：Tzu-Han Yang, Chang-Youh Tsai, Chia-Chen Hsu, Yueh-Ching Chou and Yuh-Lih Chang

篇名：Multi-target therapy of cyclosporine and mycophenolate mofetil for the treatment of lupus nephritis in patients with systemic lupus erythematosus

3. 參觀「智慧藥櫃」與「化療藥物生物安全操作臺」

此行參觀了廠商展覽（圖 6），了解美國運用科技輔助醫療來達到智慧醫院之技術，包含自動調配藥櫃 (Automated Dispensing Cabinet，又稱為智慧藥櫃)、化療藥物

生物安全操作臺等。透過智慧藥櫃（圖 7），病房常用藥可以放置在病房當中，而智慧藥櫃的資料也會與醫院電子醫囑系統同步。護理師便可以依據智慧藥櫃顯示的醫囑指示依序取出藥品，執行給藥。藥師也都可以從系統遠端得知藥品取用情形，之後依照藥品耗用情況，將所需的藥品補足。透過這樣的電腦系統輔助，能準確提升護理師的藥品取得狀況，護理師也能有更多時間處理其它臨床業務。

化療藥物生物安全操作臺（圖 8）具有強大的防誤機制，在操作臺內配有電腦螢幕與攝影機，會提示與記錄藥師調配化療藥物的每一個步驟，且內建電腦會直接計算配置完成後藥品應有的重量，若與實際藥品重量差距過大則會有警示。此外，此操作臺可連接專屬印表機，印製客製化的藥品標籤。

4. 藥學在全球醫療保健生態系統中的實踐進步

阿布達比的住院藥局分享了抗生素管制計畫，其中抗生素使用情形的監測時機點可供本院參考，包含每月追蹤抗生素耗量（days of therapy/1000 patient days）、每月統計抗生素管制計畫的介入與接受率、每年製作抗生素敏感性報告。

加拿大的住院藥局分享了透過電話藥局 (telepharmacy) 的執行方式來協助病人進行藥品評估(medication review)，透過藥師致電給病人訪問其用藥情形，改善病人健康狀態，介入案例如病人服用 Statins 引起 CK 高等副作用及血糖控制等。

5. 創造虛擬藥物 (Virtual Medicine) 並建置虛擬實境藥局 (Virtual Reality Pharmacy)

大會邀請 Cedars-Sinai 衛生系統衛生服務研究主任 Brennan Speigel 主講「如何透過虛擬實境來降低病人痛苦並促進病人健康，而達到毋須使用藥物 (Drug-Free)」。該中心研發虛擬實境 (Virtual Reality, VR) 設備並製作許多包含場景與聲音的「虛擬藥物 (Virtual Medicine)」 (圖 9) ，讓住院病人透過佩戴虛擬實境設備，即使身處病房中，也猶如來到海邊、高山、遊樂園，甚至回到自己的家中。該中心研究發現，透過虛擬藥物可有效降低病人的疼痛感 (50 位病人，Pre-VR pain 5.4 分→ Post-VR pain 4.1 分，$P<0.00001$)，另外他們也透過虛擬藥物來改善病人的血壓。

目前該中心正積極建置虛擬實境藥局 (Virtual Reality Pharmacy)，也就是虛擬實境的圖書館 (library)，透過科技專業人員繪製出不同場景與聲音的虛擬藥物，來幫助病人改善疾病狀態。該中心認為 VR 具有良好經濟效益，可以降低病人住院時間、減少藥物使用、減少藥物副作用並增加滿意度。同時，他們也將虛擬藥物應用到兒科、疼痛科、高血壓控制等領域，皆有不錯成績。

6. 藥師福祉 (Well-Being) 相關課程及活動

根據 The Agency for Healthcare Research and Quality 調查指出，將近 5 成醫師及護理師有過勞 (burnout) 的情況。雖然藥師並無相關調查，但不表示此問題不存在於藥師。ASHP 近年開始重視藥師過勞的議題，因此在大會中安排一系列 (超過 13 小時) 課程，致力於促進醫療照護者之福祉。

大會期間參加 "Protect Your Psychological Paycheck: Managing Stress, Impostor Phenomenon, and Burnout" 課程，內容提及導致藥師過勞的成因和特徵，也提出了 Impostor Syndrome (冒牌者症候群) 這個心理學名詞。有冒牌者症候群的人常覺得自己沒那麼優秀、過去的成就不該歸功於自己、遲早會露出馬腳，因此無法完全接納自己、害怕失敗，即使已經很成功，還是說服自己還不夠好，是導致過勞的重要因素。冒牌者症候群普遍存在，講者鼓勵藥師對此狀態要有意識，對自身能力進行合理評估、抑止自己落入冒牌者症候群循環、停止無謂的競爭與比較等，肯定自己並擁抱你的成功 (own your success)。

7. 醫藥新知

(1) 肺動脈高壓治療新趨勢

新藥包含 soluble guanylate cyclase stimulator 如 riociguat、oral prostacyclin 如 treprostinil diolamine 及 selective IP receptor agonist 如 selexipag。

(2) 慢性腎臟病引起之貧血治療新趨勢

新藥如 HIF-PD inhibitors 的 roxadustat、daprodustat 及 vadudstat，透過降低

體內 hepcidin 而改善貧血的情形。

8. ASHP 大會之藥師徵才

大會中的徵才展覽 Personnel Placement Service (PPS) 及 Residency Showcase 為美國國內最大規模的醫院藥師徵才博覽會。

PPS 為藥師徵才活動，由美國各家醫院設立攤位以廣招人才，與會者可提前與應徵醫院約定面試時間，此次會議期間估計超過 2,000 名與會者參加了 PPS 徵才。醫院設攤費用為美金 1510 至 3015 元，參與面試者亦需額外付費 (美金 150 至 240 元，視身份而定) 。

而 Residency Showcase 為 PGY 藥師徵才活動，由經認證可招募 PGY 藥師的醫院設攤，為有興趣應徵者提供資訊及諮詢服務。醫院設攤費用為美金 795 至 3180 元。與會者皆可進入參觀，場面盛大且相當熱鬧，藉此可瞭解美國各醫院 PGY 訓練科別、招收名額、訓練狀況等，相當多即將於 2019 畢業的學生前往此活動與正在接受 PGY 訓練的藥師請益。

9. 閉幕式神奇音樂會 (Midyear Music Festival) 慶祝 ASHP 50 週年

此次音樂會邀請 Steve Augeri、Mark McGrath、Natasha Bedingfield 等原創樂隊來演唱美國五十年代流行音樂，以慶祝 ASHP 基金會成立 50 週年。藥師憑會議名牌便可免費享用演唱會提供的小吃和點心，各國藥師齊聚一堂一邊享受音樂、一邊自在的交流，氣氛相當愉快，實屬難忘的回憶。

三、心得

ASHP 綜合大會為全球藥師之藥學盛會，今年年會主題為「Midyear Some Magic」，目標為所有與會者提供難以置信的神奇經驗。從開幕式邀請魔術強森 (Earvin "Magic" Johnson) 演講關於他的個人經歷以鼓舞並激勵藥師；網絡課程 (networking sessions and events) 體驗與眾多專家、同齡者、未來同事等各族群藥師聯繫的神奇機會；閉幕式神奇音樂會 (magic midyear music festival) 同時慶祝 ASHP 基金會成立 50 週年；並享受美國加州熱情又神奇的陽光 (Sunny California Magic Awaits!)。

1. ASHP LIVE! Mobile Meetings App

大會建置 ASHP LIVE! Mobile Meetings App，為功能完整強大且完善的會議 App，提供與會者快速取得最新會議資訊、有效率的安排課程，為參與此國際盛會所不可或缺的必備工具 (詳細介紹請見 https://vimeo.com/239153430)。ASHP LIVE! 包含 ASHP 所有會議議程、課程及講者介紹、講義 PDF、壁報列表、Residency Showcase 列表、參展廠商資訊、社群分享、聯絡講者及其他與會者、與其他與會者訊息互動、大會推播訊息等。App 介面設計相當友善 (如圖 10)。與會者可事先瀏覽課程資訊、排定自己參與的時間表。聽課時可利用 App 於講義中標註重點、打字或寫筆記等，筆記均可保存供後續閱讀或分享。此 App 也具有 IRS (Interactive Response System) 即時反饋系統功能，講者可於課程進行時提出問題，請台下聽眾用 App 傳送答案，現場立刻統計答題結果、即時反應聽眾之學習狀況，增進講者與聽者之互動，提升聽眾的參與度，讓學習變得更活潑有趣。

2. 與其他與會者互動

大會提供很多與其他與會者互動的機會，如會議中有多場 Networking session，主題：感染性疾病、抗凝血藥品、心臟內科學、重症照護等，由與會者共同討論相關議題。一般課程開始時，主持人會請聽眾與坐在附近的人互相認識及互動。課程中除了使用會議 App 進行即時反饋，講者也常請聽眾互相討論。這個難得的機會，與其他藥學專家及同儕互相討論學習，探討內容從理論到實務，期望藉由與專家經驗的交流，

進而促進藥事專業人員能更貼近社會大眾需求，落實專業職能。從討論與互動的過程中，激勵自己更加精進。

3. ASHP 學會提供藥學資源

ASHP 學會引領美國醫院藥師的發展，同時也對全球藥學發展趨勢具有巨大的貢獻及影響力。ASHP 學會提供豐富且實用的藥學資源，無論是藥師作業、臨床治療指引、規範準則、繼續教育、專科藥師認證教材與課程、與專家及同儕交流互動等，支持、協助與促進藥師執業生涯的專業表現，是目前其他藥學會所無法比擬的。藉由這次機會，也加入 ASHP 會員，將 ASHP 所提供的藥學資源帶回本部運用。

身為臺灣首屈一指國家級教學醫學中心藥學部的成員，藉由參與國際會議、分享本院藥學研究成果，積極拓展國際外交，提昇台灣藥學專業之國際能見度。此外，參與國際會議亦能勘視國際藥學之趨勢，了解藥學方向與重點，並藉由與國際專家之學術交流，擷取他國經驗與新知，啟發新的視野與思維，利於本部服務、教學、研究之再精進與創新，更加提升用藥安全與品質。最後特別感謝輔導會與院方全力支持，准以本部同仁前往參加，期望未來在國際的藥學界大會皆能繼續獲得長官支持。

四、建議事項

1. 持續強化藥局自動化調劑與資訊科技輔助功能

在自動化與資訊系統輔助下，可節省藥師人工作業人力，並降低用藥疏失。本部過去亦積極開發各項自動化調劑及以資訊科技輔助藥師執行各項藥事服務，然因資訊系統程式開發上線時程常受限於本院資訊人員人力，仍有很多已規劃完成但尚待程式撰寫的系統，期待未來能加速資訊相關需求程式設計，朝向智慧藥局 (smart pharmacy) 目標邁進。

除了程式設計外，建議本院採購智慧藥櫃、化療機器手臂或化療藥物生物安全操作臺（圖 8）。智慧藥櫃可與醫師的醫囑系統整合，醫師開立醫囑後經由藥師覆核，再由系統下指令給智慧藥櫃，醫護人員取藥時，藥櫃即會依每一病人該時間須使用的藥物分別逐次開啟藥盒，如此可以適時取得每位病人正確的藥品。

另外目前本院化療藥品配製工作都由人力親為，雖有安全衛生操作箱等防護，但無論防護如何緊密，藥師仍身處化學藥品暴露的風險中。透過引進化療機器手臂可降低對調劑者的健康危害，也可減少錯誤率。若本院能利用高科技設備導入智慧藥局，可降低人為疏失，提高給藥效率，落實藥師專業，讓藥師回到專業有價值的進階臨床藥事服務。

2. 拓展臨床藥事服務作業

將自動化、資訊系統輔助與智慧藥局所節省的藥師人力，轉於發揮臨床藥學專業之處，如執行以病人為中心的臨床藥學服務、擴大開設臨床藥師門診、建立各式疾病之藥物治療管理 (Medication Therapy Management) 服務模式，使本部藥事作業更臻完善，以確保病人用藥安全。

3. 鼓勵本院藥師取得專科藥師認證

美國專科藥師制度（board certified specialist）行之多年，近年來愈發蓬勃發展，並陸續增加多項專科，且有系統性的養成及培育流程。ASHP 大會所邀請的美國講師

幾乎都完成專科藥師認證，可見美國臨床藥學領域對專科藥師認證的重視。有臺灣目前並沒有專科藥師認證制度，因此，鼓勵本院藥師積極學習臨床藥學，取得美國專科藥師認證，提升藥師的專業與榮譽。

4. 建置會議/課程資訊 App

本院可仿照 ASHP 建置之「ASHP LIVE! Mobile Meetings App」 (App 介紹請見 P.7 心得 1)，將 EDU 全院開課系統 App 化，增加講義下載、即時反饋系統等功能，成為輔助全院人員進修的工具。藥學部一年主辦 2 至 3 場的千人藥師持續教育，及數場國際研討會，若能將議程資訊整合於 App，主辦單位可掌握學員資訊、進行滿意度調查、推廣本院課程、節省資源等，學員亦可獲得最新開課訊息、永久留存講義及筆記等，有利於主辦單位及學員雙方，為智慧教學之具體實踐。

5. 建置虛擬實境藥局 (Virtual Reality Pharmacy)

建議本院可網羅 VR 人才，開始創造本院專屬的「虛擬藥物」，進而打照「虛擬實境藥局」，以改善病人的疾病控制並提高住院滿意度。

6. 定期舉行藥師徵才會

藥師徵才展覽為 ASHP 綜合大會的重要活動之一，美國各家醫院會到 ASHP 綜合大會設攤位以廣招人才，而藥師可透過徵才展覽取得各家醫院藥局之特色與薪資待遇等資訊並可申請面試機會。建議本部可學習 ASHP 綜合大會之精神，至藥學院系舉行徵才會以網羅人才。

7. 補助藥師出國開會

近年來藥學發展日新月異，出國開會可使藥師增廣見聞、拓展國際視野，瞭解國際藥學發展趨勢以借鏡參考，推動藥師從事相關研究。建議院方每年補助本部藥師出國參加學術會議。

五、附錄

1. 大會議程

2018 ASHP Midyear Clinical Meeting & Exhibition
Anaheim, California
December 2–6, 2018

Schedule-at-a-Glance

Saturday, December 1

7:00 a.m. – 6:00 p.m.	Specialty Review and Recertification Courses
7:00 a.m. – 6:00 p.m.	Student Programming
8:00 a.m. – 5:00 p.m.	Pre-Meeting Workshops

Sunday, December 2

7:00 a.m. – 6:00 p.m.	Specialty Review and Recertification Courses
7:30 a.m. – 5:00 p.m.	Personnel Placement Service (PPS)
8:00 a.m. – 5:00 p.m.	Pre-Meeting Workshops
8:00 a.m. – 4:30 p.m.	Educational Programming
8:30 a.m. – 3:30 p.m.	Residents and New Practitioners Programming
8:30 a.m. – 7:00 p.m.	Student Programming
12:00 p.m. – 4:30 p.m.	Programming for Small and Rural Hospitals
1:00 p.m. – 3:15 p.m.	The ASHP Federal Forum
3:30 p.m. – 5:00 p.m.	Federal Forum Posters

Monday, December 3

7:30 a.m. – 5:00 p.m.	Personnel Placement Service (PPS)
9:00 a.m. – 10:30 a.m.	Opening Session and Keynote
10:45 a.m. – 11:45 a.m.	Student Posters
11:00 a.m. – 3:00 p.m.	Exhibit Program
11:30 a.m. – 5:30 p.m.	Student Programming
12:00 p.m. – 1:00 p.m.	Student Posters
1:00 p.m. – 4:00 p.m.	Residency Showcase
2:00 p.m. – 5:15 p.m.	Educational Programming
2:30 p.m. – 4:00 p.m.	Professional Posters

Tuesday, December 4

7:30 a.m. – 5:00 p.m.	Personnel Placement Service (PPS)
8:00 a.m. – 11:00 a.m.	Educational Programming
8:00 a.m. – 11:00 a.m.	Residency Showcase
10:45 a.m. – 11:45 a.m.	Student Posters
11:00 a.m. – 3:00 p.m.	Exhibit Program
12:00 p.m. – 1:00 p.m.	Student Posters
1:00 p.m. – 4:00 p.m.	Residency Showcase
1:00 p.m. – 5:30 p.m.	Student Programming
2:00 p.m. – 5:15 p.m.	Educational Programming
2:30 p.m. – 4:00 p.m.	Professional & Fellows Posters
7:00 p.m. – 9:00 p.m.	Students' Night Out

Wednesday, December 5

7:30 a.m. – 5:00 p.m.	Personnel Placement Service (PPS)
8:00 a.m. – 9:45 a.m.	Educational Programming
8:30 a.m. – 9:30 a.m.	Student Posters
10:00 a.m. – 11:00 a.m.	Spotlight on Science
10:00 a.m. – 4:00 p.m.	Resident Posters
11:00 a.m. – 2:00 p.m.	Exhibit Program
2:00 p.m. – 5:00 p.m.	Educational Programming
7:00 p.m. – 11:30 p.m.	Wednesday Evening Event

Thursday, December 6

9:00 a.m. – 3:00 p.m.	Educational Programming

ASHP | 4500 East-West Highway, Suite 900, Bethesda, Maryland 20814 | 301-657-3000

4-061

Prevalence and Clinical Consequences of Contraindicated Repaglinide-Gemfibrozil Interaction in an Ambulatory Setting

Chia-Chen Hsu, Yi-Yen Chen, Yueh-Ching Chou, Chia-Lin Chou, Yuh-Lih Chang*

Department of Pharmacy, Taipei Veterans General Hospital, Taipei, Taiwan

Purpose

Concomitant use of repaglinide with gemfibrozil may increase in repaglinide exposure, with an elevated risk of hypoglycemia. The European Medicinal Products Evaluation Agency contraindicated the concomitant use of these two drugs in 2003 according to 5 reports of severe hypoglycemic episodes in patients using them at the same time. This drug-drug interaction alert was implemented into computerized physician order entry system at a medical center in 2004. However, physicians still issued these two drugs concurrently. This study aimed to investigate the prevalence of repaglinide-gemfibrozil interaction, physicians' responses to the interaction alerts, and the clinical consequences of concomitant use.

Methods

A retrospective observational study was performed using a computerized ambulatory prescription database and information from an alert and logging system in a tertiary care medical center in Taiwan. We included prescriptions involving repaglinide or gemfibrozil through 2007 to 2014. We manually reviewed all alert and confirmed any individual changes of prescriptions in response to the alert by comparing alert prescriptions logged, final prescriptions, and medication history. Furthermore, we conducted a case series study based on reviews of electronic medical charts. We collected blood glucose data and related information about patients who concomitant use of repaglinide and gemfibrozil at the same medical center from January 2007 to September 2015.

Results

During the 8-year study period, 101,422 prescriptions involving repaglinide or gemfibrozil were prescribed for 9,197 patients. Figure 1 shows the alert rate and override rate for repaglinide-gemfibrozil interaction alerts during the study period. A total of 61 (0.66%, 61/9,197) patients received 332 prescriptions with repaglinide-gemfibrozil interaction alerts. Of these, 310 alerts for 44 (72.1%, 44/61) patients were overridden. In respond to alerts, the daily dose of gemfibrozil was reduced in 2 prescriptions (0.64%, 2/310) with override alert (Figure 2). Among the 22 prescriptions with accepted alerts, gemfibrozil was shifted to another lipid-lower drug in 9 (40.9%, 9/22), repaglinide was shifted to another oral antidiabetic drug in 8 (36.4%, 8/22) and gemfibrozil or repaglinide was canceled in 5 (22.7%, 5/22). A total of 48 patients used repaglinide and gemfibrozil concomitantly (Table 1). Over the entire 14,198-day observation time, 8 patients with 20 hypoglycemic episodes (1.41 events/1,000 patient-days) were detected. Table 2 shows the overview of patients with hypoglycemia after concomitant use of repaglinide and gemfibrozil.

Conclusion

Medical prescriptions involving contraindicated repaglinide-gemfibrozil interaction are not rare in clinical practice. Physicians usually overrode the contraindicated drug-drug interaction alerts. Exposure of these contraindicated drug-drug interaction would undoubtedly result in hypoglycemia. Concomitant use of repaglinide and gemfibrozil should be avoided to ensure drug safety.

Nothing to Disclose

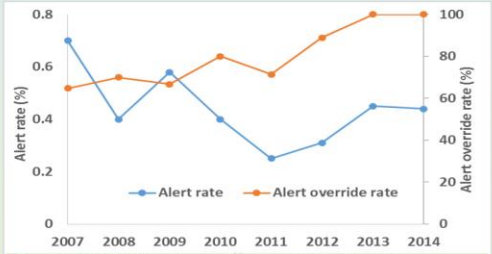

Figure 1. Alert rate and override rates for repaglinide-gemfibrozil interaction alerts between 2007 and 2014

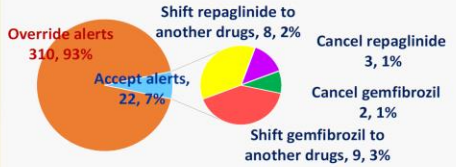

Figure 2. Physician's responses when receiving repaglinide-gemfibrozil interaction alerts (N=332)

Table 1. Patient characteristics in subjects with concurrent use of repaglinide and gemfibrozil

	No. of patients	No. of patients with hypoglycemia	Hypoglycemia episodes	Observation days	Hypoglycemia episode rate*
Total	48 (100%)	8	20	14,198	1.41
Gender					
Male	31 (64.6%)	6	6	8,577	0.70
Female	17 (35.4%)	2	14	5,621	2.49
Age (yrs)					
30-39	2 (4.2%)	0	0	1,315	0
40-49	6 (12.5%)	1	1	1,699	0.59
50-59	11 (22.9%)	0	0	3,859	0
60-69	16 (33.3%)	5	9	4,264	2.11
70-79	8 (16.7%)	1	9	2,351	3.83
80-89	4 (8.3%)	0	0	675	0
90-99	1 (2.1%)	1	1	35	28.57

*Hypoglycemia episode rate = hypoglycemia episodes/1,000 patient days

Table 2. Overviews of patients with hypoglycemia after concomitant use of repaglinide and gemfibrozil

Case	1	2	3	4	5	6	7	8
Age (years)	93	60	61	67	61	44	68	71
Gender	M	M	M	F	M	M	M	F
Observation days	35	56	200	384	798	173	299	894
Hypoglycemia events	1	1	1	5	1	1	1	9
Hypoglycemia onset (days)	8	26	11	63	275	58	6	243
Blood glucose (mg/dL)	32	46	49	65	66	69	69	70
HbA_{1C} (%)	8.0	6.2	7.2	6.9	6.5	7.3	7.8	6.2
Hospital admission/D50W injection	Yes	Yes	No	No	No	No	No	No
Hypoglycemia history within 1 year	No	No	No	No	No	No	No	Yes
Diabetes duration (years)	<1	3	>10	<1	5	<1	>10	>10
Renal function (CKD Stage)	5	HD	3	PD	3	HD	HD, PD	PD
Repaglinide dose (mg/day)	3	1	3	1	3	2	2	9
Gemfibrozil dose (mg/day)	600	257	1200	300	1200	600	600	300
Concurrent used antidiabetic drugs	Pioglitazone Linagliptin	No	Acarbose glargine	No	Sitagliptin	Pioglitazone	Detemir	Rosiglitazone glargine

CKD: chronic kidney disease, D50W: dextrose 50% in water, HD: hemodialysis, PD: peritoneal dialysis

5-126

Multi-target Therapy of Cyclosporine and Mycophenolate mofetil for the Treatment of Lupus Nephritis in Patients with Systemic Lupus Erythematosus

Tzu-Han Yang, Chang-Youh Tsai, Chia-Chen Hsu, Yueh-Ching Chou and Yuh-Lih Chang

Department of Pharmacy, Taipei Veterans General Hospital, Taiwan.

INTRODUCTION

Lupus nephritis (LN) is a common and severe manifestation of systemic lupus erythematosus (SLE). The overall cumulative incidence of renal disease is 60% at 5 years after the diagnosis of SLE in Chinese patients. Despite advances in the treatment of LN, almost 26% of patients with LN still progress to end-stage renal disease (ESRD).

Although a widely-accepted standard of care for LN is cyclophosphamide (CYC), it is limited due to a wide spectrum of toxicity, such as infection, ovarian failure, bladder toxicities, myelosuppression, and increased risk of malignancy. To limit CYC-associated severe adverse effects and improve efficacy, new alternative therapies have been extensively investigated. Contemporary emerging strategies for the treatment of LN include multi-target therapy using a combination of calcineurin inhibitors (CNIs), mycophenolate mofetil (MMF) and glucocorticoids.

OBJECTIVES

However, all of the studies dealing with multi-target therapy especially including tacrolimus, as opposed to cyclosporine (CsA). In our experience of CsA + MMF regimen for LN, we hypothesized that multi-target therapy could be an efficient therapeutic option for the treatment of LN. For this purpose, we conducted a retrospective, uncontrolled study involving 32 patients from a single medical center to determine the efficacy and safety profile of CsA + MMF in patients with LN and its association with clinical as well as laboratory manifestations.

METHODS

From September 2005 to August 2015, eligible patients with lupus nephritis under CsA plus MMF treatment were enrolled in the study. Medical charts, clinical and laboratory data were retrospectively reviewed. Patient data were collected at 0 months and included demographic information, disease duration, and laboratory findings such as serum creatinine (SCr), estimated glomerular filtration rate (eGFR), urine protein/creatinine ratio (uPCR), complement component 3 (C3), complement component 4 (C4), anti-double stranded DNA antibody (anti-dsDNA) titer, and glucocorticoid dose (equivalent dose of prednisolone). The same profiles were also recorded at months 1, 6, and 12 after the start of CsA plus MMF regimen, further including changes in the laboratory findings and the relevant adverse events.

The primary outcome measure in this study was the proportion of responders. A responder was defined as someone who achieved a complete or partial renal response (CR or PR). CR was defined as return of SCr to previous baseline level, plus a decline in uPCR (g/g Cr) of less than 0.5. PR was defined as stabilization or improvement of SCr, but not to a normal level, plus a ≥ 50% decrease in uPCR. If there was nephrotic range proteinuria (uPCR ≥ 3), improvement required ≥ 50% reduction in uPCR and an uPCR < 3. "No response" was recognized if CR or PR criteria were not met. The secondary outcome measure was conditions that progressed to ESRD, and all-cause mortality. Adverse events in the clinical course were also logged.

RESULTS

Figure 1. Among 32 patients enrolled, 15.6%, 18.8%, 28.1% achieved CR and 56.3%, 50.0%, 37.5% achieved PR at 1, 6, & 12 months, respectively. Figure 2. The SCr and eGFR remained stable during follow-up period. An improvement in proteinuria was observed (from 5.27 g/g Cr, IQR of 1.97-7.75 at baseline to 0.50 g/g Cr, IQR of 0.19-1.47 at 12 months, $p < 0.001$). Figure 3. All the other laboratory profiles including anti-dsDNA titer, C3, and C4, were significantly improved at 12 months, compared to those at baseline ($p = 0.013$, $p = 0.001$, $p < 0.001$, respectively). The median dosage of glucocorticoid was significantly decreased at 12 months, compared to the baseline observed (from 12.5 mg/day, IQR of 10.0-20.0 at baseline to 10 mg/day, IQR of 5.0-15.0 at 12 months, $p < 0.002$). There were no deaths or progression to ESRD originated from adverse events in our study.

LIMITATIONS

The limitations of our study included its retrospective design and a lack of comparator group. In addition, because few patients had received renal biopsy, we were unable to evaluate the effect of pathology on composite outcomes.

CONCLUSIONS

In conclusion, the present investigation has provided novel evidence that treatment regimens for LN including CsA + MMF are safe and effective not only on renal response but also on clinical disease activity. It deserves to know that multi-target therapy of CsA and MMF could be an therapeutic option in the treatment of refractory LN. To be more confident, a larger randomized controlled trial is warranted.

ACKNOWLEDGMENTS

We thank Chia-Lin Chou and Ying-Yu Huang for the advice on study design.

DISCLOSURES

None.

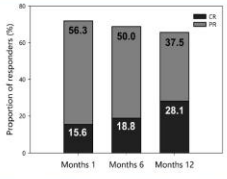

Figure 1. Proportion of Responders in Patients with Lupus Nephritis Receiving Cyclosporine and Mycophenolate mofetil (n = 32) at 1, 6 and 12 Months. CR: complete renal response. PR: partial renal response.

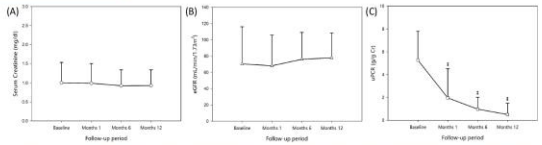

Figure 2. (A) Change in Serum Creatinine in 32 Patients with Lupus Nephritis (LN) Treated with Cyclosporine and Mycophenolate mofetil, at Baseline and after 1, 6 and 12 Months of Follow-up. The Median Serum Creatinine Remained Stable during Follow-up. (B) Change in Estimated Glomerular Filtration Rate (eGFR) in the Respective Patients. The Median eGFR Remained Stable during the Whole Monitoring Period. (C) Change in Urine Protein/Creatinine Ratio (uPCR) in the Respective Patients. The Median uPCR Was 5.27 g/g Cr, IQR of 1.97-7.75 at Baseline and Decreased Significantly ($p < 0.001$) to 0.50 g/g Cr, IQR of 0.19-1.47 at 12 months.

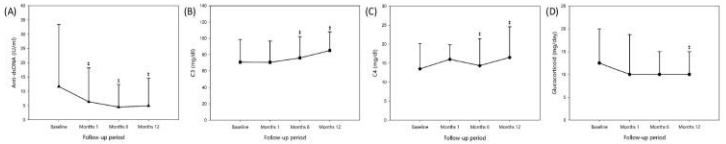

Figure 3. (A) Change in Anti-dsDNA Titer in Patients with LN Treated with Cyclosporine and Mycophenolate mofetil at Baseline and after 1, 6 and 12 Months of Follow-up. The Median (IQR) Anti-dsDNA Titer at 12 Months Was Lower than the Baseline Level [11.7 (4.9-32.5) vs. 4.9 (3.1-13.4) IU/ml, $p = 0.013$]. Normal Range for Anti-dsDNA is < 10 IU/ml. (B) Change in Serum C3 in the Respective Patients. The Median (IQR) Serum C3 Level Increased from 70.7 (45.9-98.4) to 85.1 (67.2-106.0) mg/dl at 12 Months ($p = 0.001$). Normal Range for Serum C3 Is 80 to 193 mg/dl. (C) Change in Serum C4 in the Respective Patients. The Median (IQR) Serum C4 Level Increased from 13.5 (7.3-20.1) to 16.5 (12.8-24.3) mg/dl at 12 Months ($p < 0.001$). Normal Range for Serum C4 Is 13 to 57 mg/dl. (D) Reduction of Daily Prednisolone Equivalent Dosage of Glucocorticoid during Treatment in the Respective Patients. The Median (IQR) Dose of Glucocorticoid Was 12.5 (10.0-20.0) mg/day at Baseline and Decreased Significantly ($p = 0.002$) to 10.0 (5.0-15.0) mg/day at 12 Months.

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4. 壁報論文發表之大會證明文件-1

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Certificate of Poster Presentation

This is to certify that the following poster

4-061 - Prevalence and clinical consequences of contraindicated repaglinide-gemfibrozil interaction in an ambulatory setting

Chia-Chen Hsu, Yi-Yen Chen,
Yueh-Ching Chou, Chia-Lin Chou, Yuh-Lih Chang

was presented at the

ashp MIDYEAR 2018
Clinical Meeting & Exhibition

The 53rd ASHP Midyear Clinical Meeting & Exhibition
Anaheim Convention Center
December 2-6, 2018
Anaheim, CA

Paul W. Abramowitz, Pharm.D., FASHP
Executive Vice President
Chief Executive Officer

5. 壁報論文發表之大會證明文件-2

ashp
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Certificate of Poster Presentation

This is to certify that the following poster

5-126- Multi-target therapy of cyclosporine and mycophenolate mofetil for the treatment of lupus nephritis in patients with systemic lupus erythematosus

Tzu-Han Yang, Chang-Youh Tsai, Chia-Chen Hsu, Yueh-Ching Chou, Yuh-Lih Chang

was presented at the

ashp MIDYEAR 2018
Clinical Meeting & Exhibition

The 53rd ASHP Midyear Clinical Meeting & Exhibition
Anaheim Convention Center
December 2-6, 2018
Anaheim, CA

Paul W. Abramowitz, Pharm.D., FASHP
Executive Vice President
Chief Executive Officer

6. 會議出席剪影

圖 1、美國加州安那罕會議中心

圖 2、2018 ASHP 綜合大會會場

圖 3、本部與會者合照

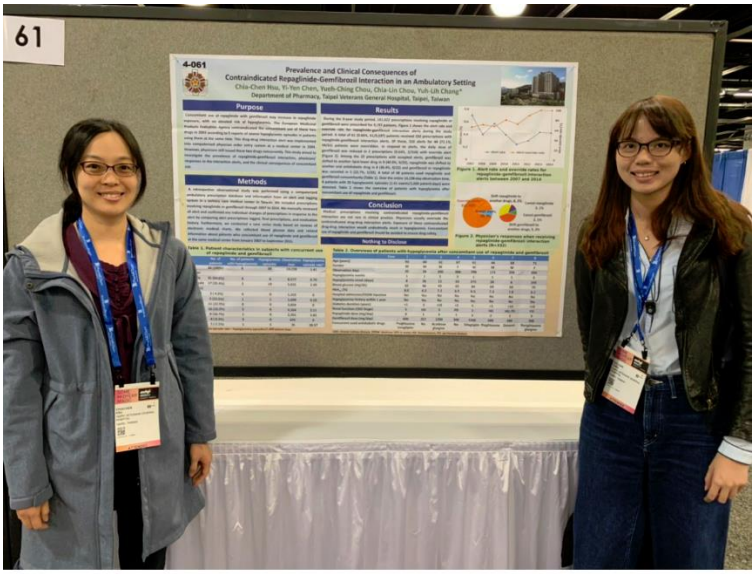

圖 4、本部壁報發表-1

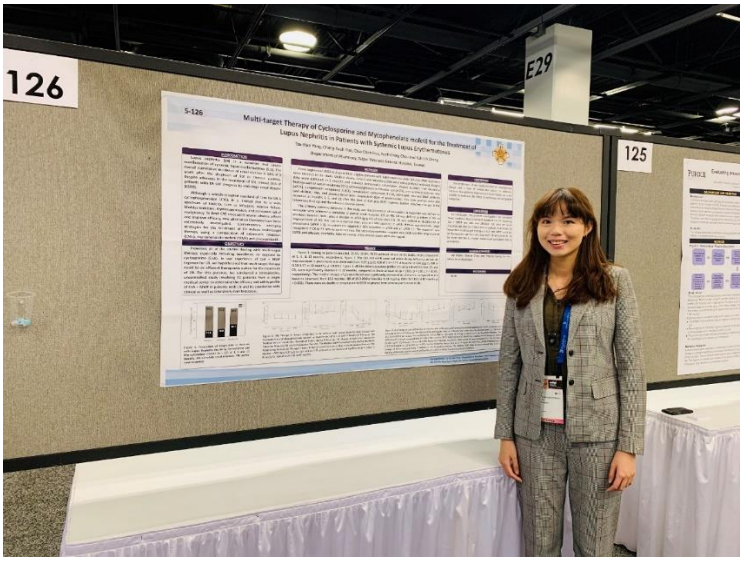

圖 5、本部壁報發表-2

圖 6、參觀廠商展覽

圖 7、智慧藥櫃

圖 8、化療藥物生物安全操作臺

圖 9、Cedars-Sinai 中心研發之虛擬藥物 (virtual medicine) 網頁畫面

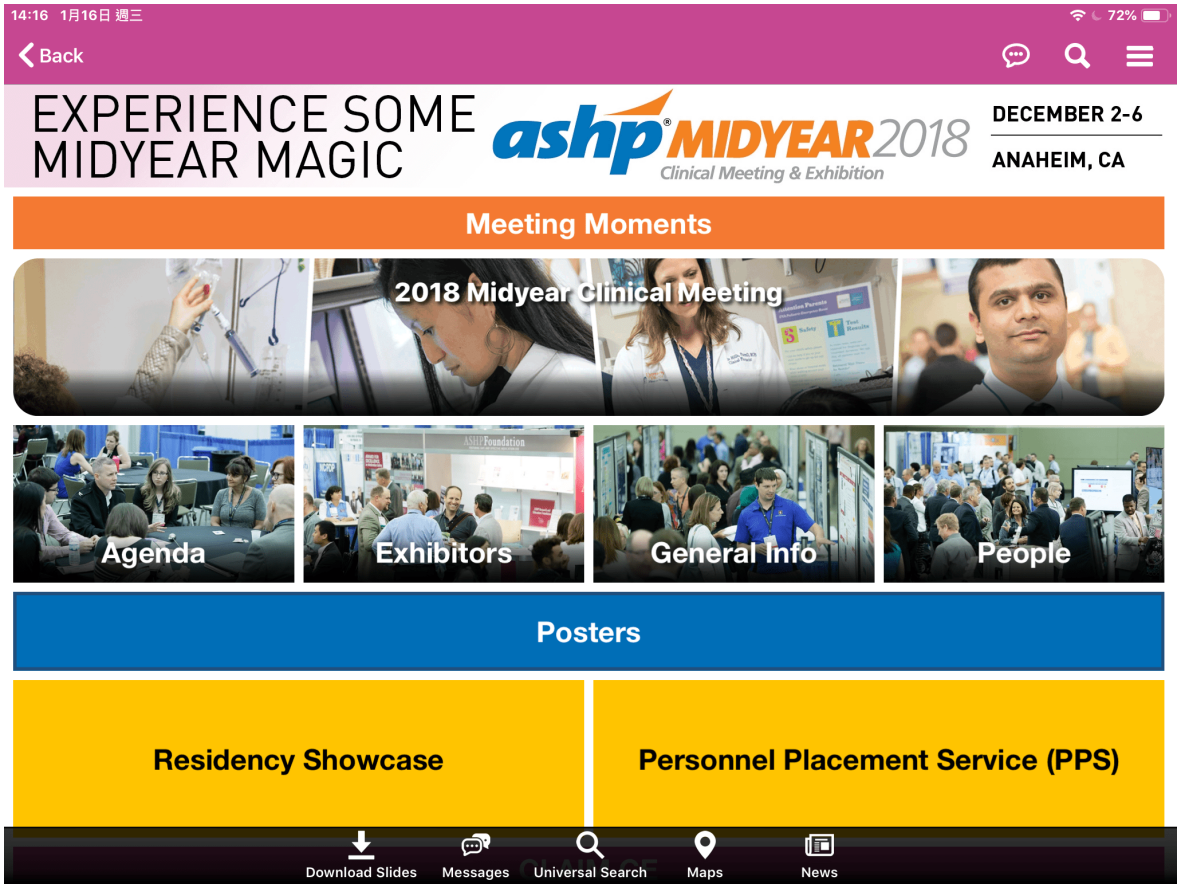

圖 10、ASHP LIVE! Mobile Meetings App 畫面