# 臺北醫學大學 泌尿腎臟研究中心 會議記錄

時間：**114 年 6 月 6 日(星期四) 9:00-10:00**

地點：視訊會議- (請以正式全名登入會議室，以利進行會議簽到)

使用 Google Meet (會議前 10 分鐘即開啟會議室)

會議室連結： https://meet.google.com/ihn-wugo-jfv

(敬略稱位)

會議主席：洪冠予

與會人員：

【附醫】劉明哲、葉劭德、吳建志、林孝友、吳政誠、張景欣、羅詩修、林敬哲、吳致寬、方德昭、吳逸文、陳錫賢、林彥仲、高治圻、陳靜怡、葉曙慶、邵月珠、周安琪

【萬芳】溫玉清、李良明、林克勳、林雍偉、蕭志豪、許軒豪、賴宗豪、鍾卓興、許永和、鄭仲益、陳作孝、劉崇德、楊韻紅、吳岳霖

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【新國民】蘇裕謀、鄒居霖

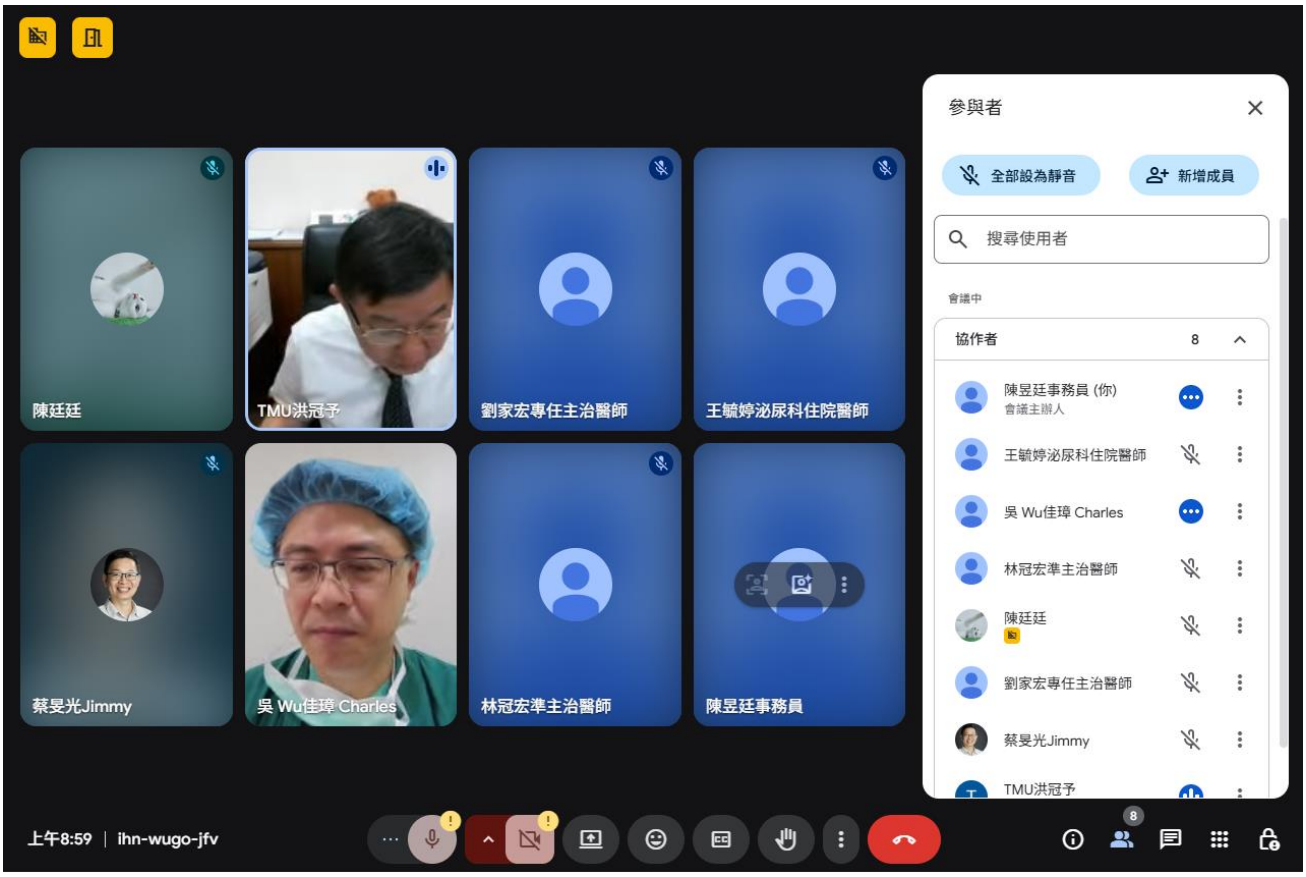
長官指導：

吳麥斯校長、許志成教授、陳瑞明所長、盧星華副院長、許永和副院長

議程：

**一、 團隊報告**

1. **功能性泌尿團隊(董劭偉醫師、王毓婷醫師)**
2. **急性腎病團隊(林冠宏醫師)**




# 膀胱內高濃度血小板血漿注射
# 對間質性膀胱炎/膀胱疼痛症候群之治療效益

**The effect of intravesical platelet-rich plasma injection for interstitial cystitis/bladder pain syndrome**

泌尿腎臟研究中心共識營(RCUK)
報告者：雙和醫院 董劭偉 醫師
雙和醫院 王毓婷 醫師

## Interstitial Cystitis/Bladder Pain Syndrome (IC/BPS)

- Unpleasant sensation centering bladder
  - Pain, pressure, and discomfort especially during bladder filling
- Often accompanied by urinary frequency and urgency
- Absence of infection/other identifiable causes
- Chronic in nature and detrimental to quality of life



## Etiology

- Infection theory
- Autoimmune theory
- **Leaky lining theory**
  - Defected mucous layer (normally made by glycosaminoglycans)
  - Urine content crossing urothelium to induce inflammation

## Treatment options

- Behavioral modification
- Oral Medications (Analgesics, amitriptyline, antihistamine, pentosan polysulfate, cyclosporine A)
- Intravesical instillation
- DSMO, heparin, and/or lidocaine
- Cystoscopic hydrodistention
- Fulguration (electrocautery)/triamcinolone injection
- Intradetrusor Botox injection
- Neuromodulation
- Cystectomy



## Plasma-rich Platelet (PRP) Injection

- Injection of autologous blood with concentrated platelets
- Plentiful signalling proteins
  - **Growth factors, chemokines, and cytokines**…etc
- **Anti-inflammatory effect and tissue regenerative capacity**
- Current indication: musculoskeletal disease

Neurourology Urodynamics

ORIGINAL CLINICAL ARTICLE

**Intravesical injections of platelet-rich plasma is effective and safe in treatment of interstitial cystitis refractory to conventional treatment—A prospective clinical trial**

Jia-Fong Jhang, Teng-Yi Lin, Hann-Chorng Kuo

First published: 21 December 2018 | https://doi.org/10.1002/nau.23898 | Citations: 26

- Single arm study (n=40)
- Inclusion: female IC/BPS refractory to conventional treatment
- Monthly PRP injections x4
- **Significant improvement** since the 1st injection until 3 months after treatment completion
  - **Subjective questionnaires** (GRA, OSS, and VAS)
  - **Functional bladder capacity**
  - **Urinary frequency, urgency, and nocturia**



Article | Open access | Published: 16 September 2020

**Repeated intravesical injections of platelet-rich plasma improve symptoms and alter urinary functional proteins in patients with refractory interstitial cystitis**

Yuan-Hong Jiang, Yuh-Chen Kuo, Jia-Fong Jhang, Cheng-Ling Lee, Yung-Hsiang Hsu, Han-Chen Ho & Hann-Chorng Kuo

- **Significant change in urinary biomarkers** along symptom improvement
  - Nerve growth factor, matrix metalloproteinase-13, vascular endothelial growth factor ↓↓
  - Platelet-derived growth factor-AB ↑↑

## Therapeutic Efficacy of Intravesical Platelet-Rich Plasma Injections for Interstitial Cystitis/Bladder Pain Syndrome—A Comparative Study of Different Injection Number, Additives and Concentrations

*Yuan-Hong Jiang[1], Jia-Fong Jhang[1], Teng-Yi Lin[2], Han-Chen Ho[3], Yung-Hsiang Hsu[4] and Hann-Chorng Kuo[1]**

[1]Department of Urology, Hualien Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Tzu Chi University, Hualien, Taiwan, [2]Department Laboratory Medicine, Hualien Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Hualien, Taiwan, [3]Department of Anatomy, Tzu Chi University, Hualien, Taiwan, [4]Department of Pathology, Hualien Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Tzu Chi University, Hualien, Taiwan*

| 10ml PRP | |
|---|---|
| 4 low-dose subgroup | 1 high-dose group |
| • in N/S injected at 20 sites | • in N/S injected at 20 sites<br>• in PPP injected at 20 sites<br>• in N/S injected at 40 sites<br>• in PPP injected at 40 sites |



# Our experience

- Retrospective review
- 112/01/01-114/06/30

# PICO

| | |
|---|---|
| **Patient/Problem** | 間質性膀胱炎/膀胱疼痛症候群之女性患者 |
| **Intervention** | 膀胱內PRP注射 ＋ 水擴張治療 |
| **Comparison** | 受試者治療後與治療前的狀態比較 |
| **Outcome** | 症狀問卷調查表：<br>1) O'Leary Sant Score，內含Interstitial cystitis symptom index與Interstitial cystitis problem index |



# O'Leary Sant Score (ICSI/ICPI)

**★ IC症狀指數 (Interstitial Cystitis Symptom Index, ICSI)，總分：_____**

| | 完全不會 | 少於1/5 | 少於1/2 | 大約1/2 | 超過1/2 | 幾乎每次 |
|---|---|---|---|---|---|---|
| 1. 在過去一個月內，你是否有無預警地強烈感覺要小便?有多常發生這種情形? (URGENCY) | 0 | 1 | 2 | 3 | 4 | 5 |
| 2. 在過去一個月內，你是否在小便完 2 小時內又覺得要小便?有多常發生這種情 形 ? (RESIDUAL SENSATION) | 0 | 1 | 2 | 3 | 4 | 5 |
| 3. 在過去一個月內，你最常在晚上起來上幾次廁所? (NOTURIA) | 0 | 1 | 2 | 3 | 4 | 5 |
| 4. 在過去一個月內，你會感覺到膀胱疼痛或有灼熱感嗎? (PAIN) | 0 | 1 | 2 | 3 | 4 | 5 |
| FBC= _____ML, D= _____/N | | | | | | |

**★ IC 問題指數 (Interstitial Cystitis Problem Index, ICPI)，總分：**
**過去一個月間，以下的症狀對你而言是個困擾的問題**

| | 沒有問題 | 很小的問題 | 小問題 | 中等問題 | 大問題 |
|---|---|---|---|---|---|
| 白天頻尿 (FREQUENCY) | 0 | 1 | 2 | 3 | 4 |
| 夜間頻尿 (NOCTURIA) | 0 | 1 | 2 | 3 | 4 |
| 突然感覺急著要小便 (URGENCY) | 0 | 1 | 2 | 3 | 4 |
| 膀胱灼熱疼痛不舒服或有壓迫感 (PAIN) | 0 | 1 | 2 | 3 | 4 |

# 排除條件

- 尿路感染篩檢陽性
- 有顯著血尿(>RBC 5/HPF)
- 有其他明顯造成下泌尿道症狀之病因：膀胱無力、應力性尿失禁、尿路出口阻塞、腦部或神經源性疾病、糖尿病控制不佳 (糖化血色素≥8)、尿路結石等
- 過去六個月內有接受泌尿道手術
- 過去六個月內有接受圍繞會陰的手術或會陰有傷口、感染
- 有潛在泌尿系統癌症
- 有明顯凝血功能異常、肝腎功能衰竭、或嚴重心血管疾病
- 曾接受骨盆腔放射線治療或有骨盆腔器官惡性腫瘤史
- 有合併其他疾病或傷害所造成之慢性骨盆腔疼痛
- 過去六個月因排尿功能不佳而需常規導尿
- 過去12個月內有藥物或酒精濫用史



# 膀胱內PRP注射 + 水擴張治療

**PRP備製與注射**

每次療程於刀房抽取20ml的血液，經離心處理後可萃取出約5ml的PRP，將這些血漿以每0.25ml為單位隨機但均勻的注射到膀胱後壁與側壁粘膜下層約0.1公分的深度，總計注射次數共20針。

**水擴張**

完成膀胱內注射後立即進行水擴張治療，將生理食鹽水吊於離受試者身體水平面80公分的高度，使水流能透過重力被持續灌注到膀胱，灌注共計五分鐘以完成水擴張治療。



劑量較低

## Our experience

- Retrospective review
- 112/01/01-114/06/30
- 9 patients
- 4/9 with data available for analysis



# Case 1

# Case 1

- 74-year-old female patients
- Received operations on 112/10/16, 112/12/11, 113/01/15
- Chief complaint: bladder pain resulting in frequency



# Case 1

| | ICSI | |
|---|---|---|
| | **Before** | **After** |
| Urgency | 0 | 0 |
| Frequency (daytime) | 4 | 3 |
| Frequency (nighttime) | 4 | 2 |
| Bladder pain | 4 | 2 |
| **Total** | **12** | **7** |

| | ICPI (Impact on quality of life) | |
|---|---|---|
| | **Before** | **After** |
| Frequency (daytime) | 4 | 3 |
| Frequency (nightimte) | 4 | 3 |
| Urgency | 0 | 0 |
| Bladder pain | 4 | 3 |
| **Total** | **12** | **9** |

# Case 2



## Case 2

- 60-year-old female patients
- Received operations on 112/11/14, 113/01/22
- Chief complaint: bladder pain resulting in frequency

# Case 2

| | ICSI | |
|---|---|---|
| | **Before** | **After** |
| Urgency | 0 | 0 |
| Frequency (daytime) | 3 | 1 |
| Frequency (nighttime) | 4 | 1 |
| Bladder pain | 4 | 1 |
| **Total** | **11** | **3** |

| | ICPI (Impact on quality of life) | |
|---|---|---|
| | **Before** | **After** |
| Frequency (daytime) | 0 | 0 |
| Frequency (nightimte) | 4 | 0 |
| Urgency | 0 | 0 |
| Bladder pain | 4 | 0 |
| **Total** | **8** | **0** |



# Case 3

## Case 3

- 43-year-old female patients
- Received operations on 113/02/02
- Chief complaint: frequency



## Case 3

| | ICSI | |
|---|---|---|
| | **Before** | **After** |
| Urgency | 0 | 0 |
| Frequency (daytime) | 3 | 2 |
| Frequency (nighttime) | 4 | 2 |
| Bladder pain | 0 | 0 |
| **Total** | **7** | **4** |

| | ICPI (Impact on quality of life) | |
|---|---|---|
| | **Before** | **After** |
| Frequency (daytime) | 4 | 3 |
| Frequency (nightimte) | 4 | 3 |
| Urgency | 0 | 0 |
| Bladder pain | 0 | 0 |
| **Total** | **8** | **6** |

# Case 4



## Case 4

- 43-year-old female patients
- Received operations on 113/05/06
- Chief complaint: bladder pain

# Case 4

| | ICSI | |
|---|---|---|
| | **Before** | **After** |
| Urgency | 0 | 0 |
| Frequency (daytime) | 0 | 0 |
| Frequency (nighttime) | 0 | 0 |
| Bladder pain | 4 | 0 |
| **Total** | **4** | **0** |

| | ICPI (Impact on quality of life) | |
|---|---|---|
| | **Before** | **After** |
| Frequency (daytime) | 0 | 0 |
| Frequency (nightimte) | 0 | 0 |
| Urgency | 0 | 0 |
| Bladder pain | 4 | 0 |
| **Total** | **4** | **0** |



# Total Score and Change

| Total | ICSI | ICPI |
|---|---|---|
| Case 1 | 12 → 7 (-5) | 12 → 9 (-3) |
| Case 2 | 11 → 3 (-8) | 8 → 0 (-8) |
| Case 3 | 7 → 4 (-3) | 8 → 6 (-2) |
| Case 4 | 4 → 0 (-4) | 4 → 0 (-4) |

## Summary

IC/BPS treatment remains challenging.

Intravesical PRP is a potential regenerative approach for symptom relief.

Our experience symptom improvement and good tolerability.
No severe adverse effects were observed.



## Summary

PRP delivers growth factors that aid urothelial healing and reduce inflammation.

Compared to Botox, PRP may lower the risk of urinary retention.

Standardized protocols for PRP preparation and administration are needed.

## Future

Conduct larger, prospective controlled trials.

PRP may also be useful for ketamine cystitis and other bladder diseases.

Biomarkers could help diagnose and guide precise PRP injection sites for better outcomes."




臺北醫學大學
泌尿腎臟研究中心
TMU Research Center of
Urology and Kidney

# 急性腎病團隊
# oXiris experience
# during 109/01 – 114/03 at SHH

報告人：林冠宏 醫師

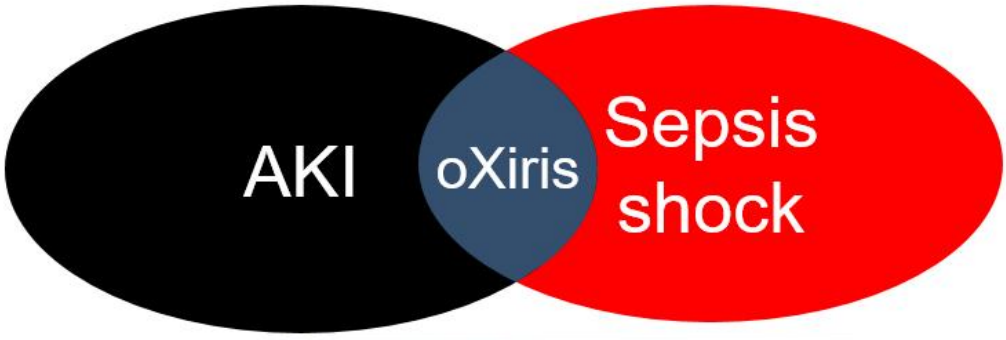
114.06.26

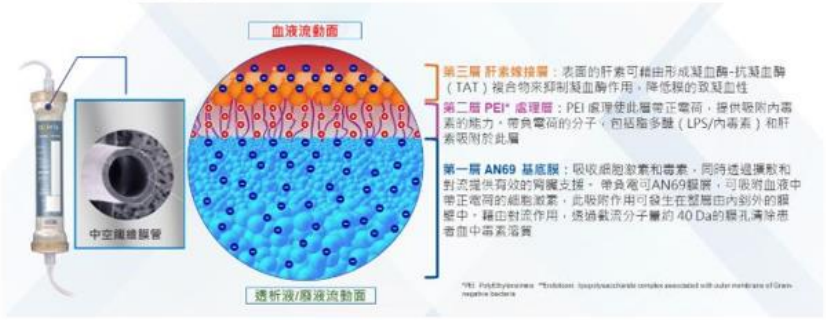
# The four principles of medical ethics

- Autonomy
- Beneficence
- Non-maleficence
- Justice

| Evidence-based medicine | |
|---|---|
| P | GNB sepsis |
| I | infection source control, antibiotics, cardiopulmonary support + hemadsorption |
| C | infection source control, antibiotics, cardiopulmonary support |
| O | ICU stay, AKD and RRT dependent, mortality |

# *Oxiris®: Does it really a LIFESAVER ?*



# Hemadsorption

- **nonspecific adsorbents**：
  - charcoal
  - resins
- **adsorptive membranes**：
  - polymethyl methacrylate (PMMA)
  - AN69ST
  - **Polymyxin B**: EUPHAS trial、EUPHRATES
  - LPS Adsorber
  - **CytoSorb**
  - **Oxiris**

# PMX-B：EUPHAS trial

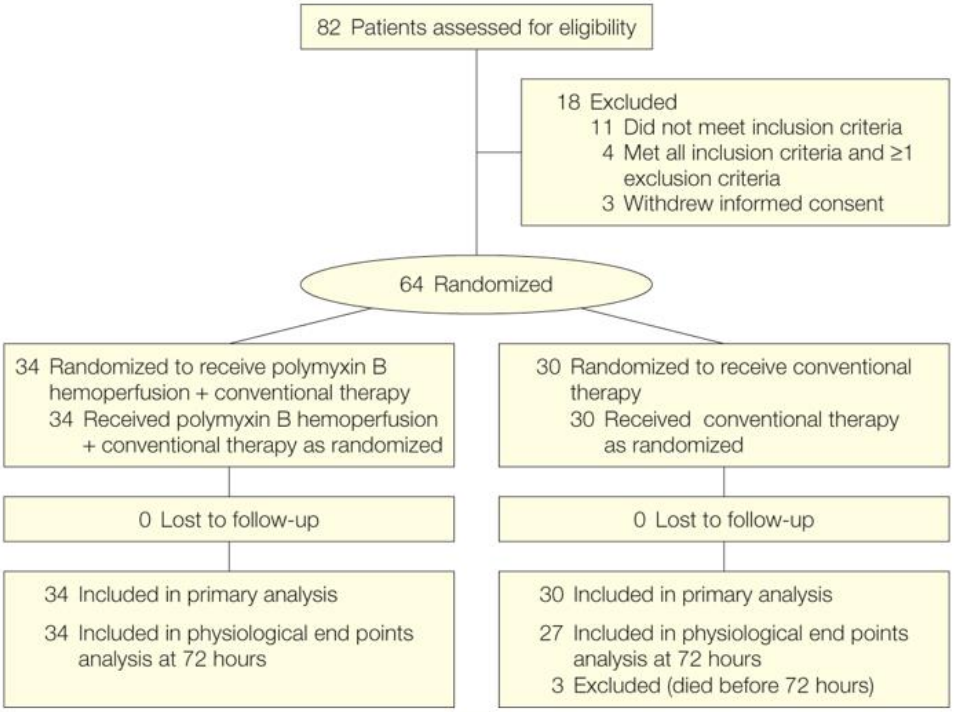


**Table 1.** Baseline Characteristics of the Treatment Groups[a]

| Characteristics | Mean (95% Confidence Interval) | | *P* Value |
|---|---|---|---|
| | Polymyxin B Hemoperfusion (n = 34) | Conventional Therapy (n = 30) | |
| Age, y | 61 (57-66) | 67 (61-72) | .09 |
| Male sex, No. (%) | 24 (71) | 18 (60) | .53 |
| APACHE II score | 21 (19-23) | 20 (18-23) | .86 |
| SOFA score | 11 (10-12) | 9 (8-11) | .07 |
| Mean arterial pressure, mm Hg | 76 (72-80) | 74 (70-78) | .40 |
| Noradrenaline, μg/kg/min | 0.27 (0.17-0.36) | 0.24 (0.13-0.36) | .70 |
| Dopamine, μg/kg/min | 3.1 (1.7-4.4) | 4.6 (2.9-5.6) | .13 |
| Inotropic score | 29.9 (20.4-39.4) | 28.6 (16.6-40.7) | .85 |
| Vasopressor dependency index, mm $Hg^{-1}$ | 4.3 (2.7-5.9) | 4.1 (2.3-6.0) | .87 |
| White blood cell count, 1000/μL | 13.7 (11.4-16.0) | 11.4 (9.0-13.8) | .12 |
| $PaO_2/FIO_2$ | 235 (206-265) | 217 (188-247) | .53 |
| Diuresis, mL/h | 66 (50-90) | 87 (59-116) | .22 |
| Creatinine, mg/dL | 2.3 (1.7-2.9) | 1.7 (1.3-2.2) | .18 |
| Renal replacement therapy, No. (%) | 13 (38) | 6 (20) | .17 |

Abbreviations: APACHE II, Acute Physiology and Chronic Health Evaluation II; $FIO_2$, fraction of inspired oxygen; SOFA, Sequential Organ Failure Assessment.

SI conversion: To convert creatinine to μmol/L, multiply by 88.4.

[a]Patients in the polymyxin B hemoperfusion group were treated with 2 sessions of direct hemoperfusion with polymyxin B in addition to standard conventional therapy. Range of APACHE II score was 0 to 71, with lower scores indicating better organ function. Range of SOFA score was 0 to 24, with lower scores indicating better organ function. See "Methods" section for formulas for inotropic score and vasopressor dependency index.

**Table 2.** Isolated Microorganisms by Treatment Group

| Organisms and Sites | Polymyxin B Hemoperfusion | Conventional Therapy |
|---|---|---|
| Organisms | | |
| *Escherichia coli* | 10 | 10 |
| *Pseudomonas* species | 7 | 5 |
| *Bacillus* species | 1 | 0 |
| *Enterococcus* species | 5 | 0 |
| *Staphylococcus* species | 3 | 0 |
| *Streptococcus* species | 1 | 0 |
| *Candida* species | 6 | 5 |
| *Enterobacter* species | 4 | 1 |
| *Klebsiella* species | 1 | 0 |
| *Proteus* species | 1 | 3 |
| *Corynebacterium* species | 0 | 1 |
| *Aspergillus* species | 0 | 1 |
| *Serratia* species | 0 | 2 |
| Sites | | |
| Peritoneal, abdominal fluid, drainage | 9 | 10 |
| Blood | 16 | 3 |
| Urine | 2 | 1 |
| Other | 2 | 2 |
| Multiple organisms | 13 | 9 |
| Multiple sites | 6 | 1 |

**Table 3.** Physiological End Points by Treatment Group at Baseline and 72 Hours[a]

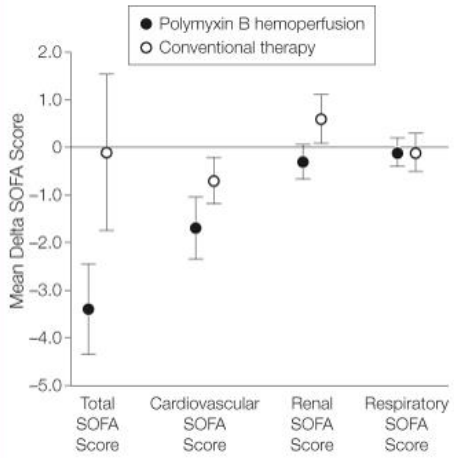
| Physiological End Points | Polymyxin B Hemoperfusion Mean (95% CI) Baseline (n = 34) | Polymyxin B Hemoperfusion Mean (95% CI) 72 Hours (n = 34) | *P* Value | Conventional Therapy Mean (95% CI) Baseline (n = 30) | Conventional Therapy Mean (95% CI) 72 Hours (n = 27) | *P* Value |
|---|---|---|---|---|---|---|
| Mean arterial pressure, mm Hg | 76 (72-80) | 84 (80-88) | .001 | 74 (70-78) | 77 (72-82) | .37 |
| Inotropic score | 29.9 (20.4-39.4) | 6.8 (2.9-10.7) | <.001 | 28.6 (16.6-40.7) | 22.4 (9.3-35.5) | .14 |
| Vasopressor dependency index, mm $Hg^{-1}$ | 4.3 (2.7-5.9) | 0.9 (0.3-1.5) | <.001 | 4.1 (2.3-6.0) | 3.3 (1.3-5.3) | .26 |
| $PaO_2/FIO_2$ | 235 (206-265) | 264 (236-292) | .049 | 217 (188-247) | 228 (199-258) | .79 |
| Renal replacement therapy, No. (%) | 13 (38) | 15 (44) | .50 | 6 (20) | 8 (30) | .50 |

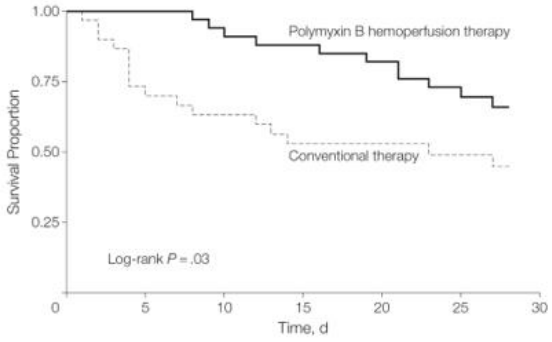
Abbreviations: CI, confidence interval; $FIO_2$, fraction of inspired oxygen.
[a]See "Methods" section for formulas for inotropic score and vasopressor dependency index. In the conventional therapy group, 3 patients died before 72 hours (n=27).

**Table 4.** All-Cause Mortality Rates by Treatment Group

| | 28 Days | | In-Hospital | |
|---|---|---|---|---|
| | Polymyxin B Hemoperfusion | Conventional Therapy | Polymyxin B Hemoperfusion | Conventional Therapy |
| No. of deaths | 11 | 16 | 14 | 20 |
| Time at risk, d | 805 | 491 | 1265 | 960 |
| Mortality rate per 100 patient-days, mean (95% CI) | 1.4 (0.8-2.4) | 3.2 (2.0-5.3) | 1.1 (0.6-1.9) | 2.1 (1.3-3.2) |

Abbreviation: CI, confidence interval.




No. at risk

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Polymyxin B hemoperfusion therapy | 34 | 34 | 32 | 30 | 27 | 22 | 18 |
| Conventional therapy | 30 | 22 | 19 | 15 | 15 | 12 | 11 |

added to conventional therapy significantly improved hemodynamics and organ dysfunction and reduced 28-day mortality in a targeted population with severe sepsis and/or septic shock from intra-abdominal gram-negative infections

Cruz DN, Antonelli M, Fumagalli R, et al. Early use of polymyxin B hemoperfusion in abdominal septic shock: the EUPHAS randomized controlled trial. JAMA. 2009;301:2445-2452.

# PMX-B ： EUPHRATES trial

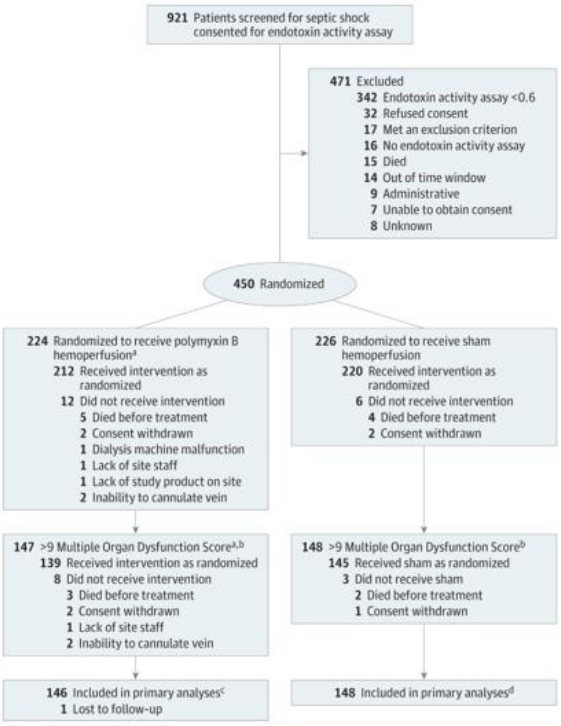


Table 1. Baseline Characteristics of All Participants and Those With a MODS of More Than 9[a]

| Variables | All Participants, No. (%) | | MODS >9 Population, No. (%) | |
|---|---|---|---|---|
| | Polymyxin-B Hemoperfusion (n = 224) | Sham (n = 226) | Polymyxin-B Hemoperfusion (n = 147) | Sham (n = 148) |
| Age, mean (SD), y | 60.9 (15.1) | 58.8 (14.7) | 59.5 (15.1) | 59.2 (14.0) |
| Sex | | | | |
| Women | 84 (37.5) | 93 (41.2) | 51 (34.7) | 57 (38.5) |
| Men | 140 (62.5) | 133 (58.8) | 93 (65.3) | 91 (61.5) |
| Race/ethnicity | | | | |
| White | 183 (81.7) | 187 (82.7) | 119 (81.0) | 112 (75.7) |
| Black | 22 (9.8) | 13 (5.8) | 13 (8.8) | 13 (8.8) |
| Hispanic | 10 (4.5) | 12 (5.3) | 7 (4.8) | 10 (6.8) |
| Asian | 3 (1.3) | 9 (4.0) | 2 (1.4) | 8 (5.4) |
| Other[b] | 6 (2.7) | 5 (2.2) | 6 (4.1) | 5 (3.4) |
| Arterial pressure, mean (SD), mm Hg | 71.8 (9.9) | 73.3 (10.5) | 71.0 (9.7) | 72.9 (10.6) |
| APACHE II score, mean (SD)[c] | 29.4 (9.0) | 28.1 (8.5) | 32.0 (8.8) | 30.5 (8.1) |
| MODS score, mean (SD) | 10.0 (3.3) | 10.0 (3.3) | 11.9 (2.0) | 11.9 (1.8) |
| Mechanical ventilation | 208 (93.0) | 217 (96.0) | 142 (97.9) | 147 (99.3) |
| Microorganisms[d] | | | | |
| No growth | 73 (32.9) | 78 (34.7) | 49 (33.3) | 44 (29.7) |
| Gram negative | 53 (23.9) | 30 (13.3) | 36 (24.5) | 21 (14.2) |
| Gram positive | 49 (22.1) | 51 (22.7) | 31 (21.1) | 41 (27.7) |
| Other | 15 (6.8) | 15 (6.7) | 10 (6.8) | 9 (6.1) |
| Mixed | 32 (14.4) | 51 (22.7) | 21 (14.3) | 33 (22.3) |
| Bacteremia[e] | 72 (33.0) | 62 (28.1) | 48 (33.1) | 45 (30.8) |

| | | | | |
|---|---|---|---|---|
| Site of infection | | | | |
| Intra-abdominal | 71 (32.4) | 80 (35.7) | 48 (33.6) | 56 (37.8) |
| Lung | 75 (34.3) | 87 (38.8) | 50 (35.0) | 56 (37.8) |
| Mixed | 10 (4.6) | 13 (5.8) | 7 (4.9) | 7 (4.7) |
| Other[f] | 63 (28.8) | 44 (19.6) | 38 (26.6) | 29 (19.6) |
| Cumulative vasopressor index, mean (SD)[g] | | | | |
| 0 to ≤5 | 102 (45.7) | 89 (39.4) | 55 (37.7) | 49 (33.1) |
| 6 to ≤10 | 86 (38.6) | 109 (48.2) | 63 (43.2) | 77 (52.0) |
| 11 to ≤15 | 33 (14.8) | 25 (11.1) | 27 (18.5) | 19 (12.8) |
| 16 to ≤20 | 2 (0.9) | 3 (1.3) | 1 (0.7) | 3 (2.0) |
| Norepinephrine dose, mean (SD), μg/kg/min | | | | |
| 0 to ≤0.05 | 18 (8.0) | 11 (4.9) | 8 (5.4) | 4 (2.7) |
| 0.05 to ≤0.1 | 34 (15.2) | 27 (12.0) | 22 (15.0) | 15 (10.1) |
| >0.1 | 159 (71.0) | 177 (78.3) | 112 (76.2) | 122 (82.4) |
| Missing or not applicable | 13 (5.8) | 11 (4.9) | 5 (3.4) | 7 (4.7) |
| AKIN AKI stage[h] | | | | |
| No AKI | 59 (26.3) | 59 (26.1) | 26 (17.7) | 27 (18.2) |
| Stage 1 | 28 (12.5) | 31 (13.7) | 18 (12.2) | 19 (12.8) |
| Stage 2 | 33 (14.7) | 27 (12.0) | 19 (12.9) | 18 (12.2) |
| Stage 3 | 104 (46.4) | 109 (48.2) | 84 (57.1) | 84 (56.8) |
| Renal replacement therapy | 47 (21.0) | 62 (27.4) | 37 (25.2) | 45 (30.4) |
| Endotoxin activity assay levels, mean (SD) | 0.77 (0.1) | 0.77 (0.1) | 0.80 (0.2) | 0.80 (0.2) |
| Range, No. (%) | | | | |
| 0.60 to 0.69 | 70 (31.3) | 78 (34.5) | 49 (33.3) | 49 (33.1) |
| 0.70 to 0.79 | 54 (24.1) | 63 (27.9) | 28 (19.1) | 39 (26.4) |
| 0.80 to 0.89 | 57 (25.5) | 49 (21.7) | 36 (24.5) | 31 (21.0) |
| 0.90 to 0.99 | 23 (10.3) | 22 (9.7) | 17 (11.6) | 18 (12.2) |
| ≥1.00 | 20 (8.9) | 14 (6.2) | 17 (11.6) | 11 (7.4) |

**Table 2. Summary of the Primary End Point of 28-Day Mortality for All Participants and for Patients With MODS of More Than 9**

| | No./Total (%) | | (95% CI) | | |
|---|---|---|---|---|---|
| | Polymyxin-B Hemoperfusion | Sham | Risk Difference | Risk Ratio | *P* Value[a] |
| All Participants | 84/223 (37.7) | 78/226 (34.5) | 3.15 (−5.73 to 12.04) | 1.09 (0.85 to 1.39) | .49 |
| >9 MODS[b] | 65/146 (44.5) | 65/148 (43.9) | 0.60 (−10.75 to 11.97) | 1.01 (0.78 to 1.31) | .92 |

[a] *P* values were calculated by $\chi^2$ and were unadjusted.

[b] Multiple Organ Dysfunction Score (MODS)–measure of altered organ function in acutely ill patients using 6 organ systems with weighted scores (0, normal; 4, severe) of each organ system (MODS range, 0-24). A higher score is associated greater burden of organ dysfunction. A MODS of 9 to 12 points has a hospital mortality of approximately 50%. Prior to the protocol amendment, the MODS score was calculated at baseline (time of randomization to the initiation of the study treatment). After the amendment, MODS of more than 9 was included at the time of screening, prior to randomization.

**Table 3. Per-Protocol (Each Group Received 2 Treatments) 28-Day Mortality**

| | No./Total (%) | | | |
|---|---|---|---|---|
| Population | Polymyxin-B Hemoperfusion | Sham | Difference, % (95% CI) | *P* Value[a] |
| All participants | 50/173 (28.9) | 59/202 (29.2) | −0.3 (−9.5 to 8.9) | .94 |
| >9 MODS | 38/115 (33.0) | 47/129 (36.4) | −3.1 (−15.2 to 9.0) | .58 |

Abbreviation: MODS, Multiple Organ Dysfunction Score.

[a] *P* values calculated using $\chi^2$.

Among patients with septic shock and high endotoxin activity, polymyxin B hemoperfusion treatment plus conventional medical therapy compared with sham treatment plus conventional medical therapy did not reduce mortality at 28 days.

Dellinger RP, Bagshaw SM, Antonelli M, Foster DM, Klein DJ, Marshall JC, Palevsky PM, Weisberg LS, Schorr CA, Trzeciak S, Walker PM; EUPHRATES Trial Investigators. Effect of Targeted Polymyxin B Hemoperfusion on 28-Day Mortality in Patients With Septic Shock and Elevated Endotoxin Level: The EUPHRATES Randomized Clinical Trial. JAMA. 2018 Oct 9;320(14):1455-1463. doi: 10.1001/jama.2018.14618. PMID: 30304428; PMCID: PMC6233793.

# CytoSorb® animal study

support the concept of chemokine gradient control of leukocyte trafficking and demonstrate the efficacy of apheresis to target this mechanism and reduce leukocyte infiltration into the lung

Peng ZY, Bishop JV, Wen XY, Elder MM, Zhou F, Chuasuwan A, Carter MJ, Devlin JE, Kaynar AM, Singbartl K, Pike F, Parker RS, Clermont G, Federspiel WJ, Kellum JA. Modulation of chemokine gradients by apheresis redirects leukocyte trafficking to different compartments during sepsis, studies in a rat model. Crit Care. 2014 Jul 3;18(4):R141. doi: 10.1186/cc13969. PMID: 24992991; PMCID: PMC4227131.

# oXiris®

Treatment with an oXiris membrane can positively impact vasopressors' requirement but not influence SOFA score, procalcitonin or lactate levels, or mortality in septic shock patients.

Mielnicki, W.; Dyla, A.; Zając, M.; Rokicka-Demitraszek, N.; Smereka, J. Does Continuous Renal Replacement Therapy with oXiris in Septic Shock Have Any Positive Impact? Single-Centre Experience with oXiris Therapy in Septic Shock Patients. *J. Clin. Med.* **2024**, *13*, 7527. https://doi.org/10.3390/jcm13247527

# oXiris® during 109/01 – 114/03

- Oxiris 54 person-time (30 pt) in SHH during 109/01-114/03
  - clinic vasopressor requirement decrease
  - ICU stay days
  - 28 days mortality
  - AKD with RRT dependent

- CVVH 5300 person-time in SHH during 109/01-114/03

# Conclusion

- 分析雙和醫院oXiris使用經驗，投稿期刊。