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Oral Presentation 112_O 1

Sex-differences in Asian populations with hemodynamically-significant chronic aortic regurgitation

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Objective

To examine clinical-differences between Asian men and women with hemodynamically-significant chronic aortic regurgitation (AR) and compare findings from westerners.

Methods

Consecutive patients with \geq moderate-severe AR (n=1305) undergoing echocardiograms were retrospectively identified from 2008 through 2022 from 3 tertiary referral centers. Endpoints included aortic valve surgery (AVS), all-cause death (ACD) and cardiovascular death (CVD).

Results

At baseline, compared to men (63 \pm 17 years; n=968), women (69 \pm 16 years; n=337) were older, more symptomatic, had more comorbidity, larger indexed aorta size, and larger left ventricular end-systolic dimension index (LVESDi) (all <0.001). LVESDi >20 mm/m² was noted in 90% asymptomatic women versus 71% asymptomatic men (P <0.001). The correlation of symptomatic status and degree of LV remodeling was better in men. Median follow-up was 3.9 (IQR: 1.3-7.1) years. Women were independently associated with less AVS (P \leq 0.0001); overall 10-year survival for ACD and CVD was better in men than women (P \leq 0.002). However, 10-year post-AVS survival was similar between sexes (P=0.9). AR-progression related LV remodeling was similar between sexes (P=0.86). Multivariable independent determinants of ACD and CVD were age, symptoms, indexed aorta size, LV parameters, and Taiwanese (all P \leq 0.04) but not female-sex; AVS was protective. Adjusted mortality cutoffs for LV ejection fraction, LVESDi, LV end-systolic volume index (LVESVi) and indexed aorta size in women are 53%, 26 mm/m², 44 ml/m² and 25 mm/m², respectively; the corresponding cutoffs in men are 53%, 23.5 mm/m², 50 ml/m² and 23 mm/m², respectively.

Conclusions

Sex-differences in Asian AR patients did exist and the survival condition was similar to western cohort. Women had survival penalty due to disadvantages they carried, including older age, advanced symptoms, more comorbidity, and less AVS, but not due to sex per se. It was encouraging that women had similar post-AVS survival versus men, suggesting that to close survival-gap in female patients, taking abovementioned sex-specific mortality-cutoffs into account for early surgical referral is important.



Oral Presentation 112_O 2

探討新冠肺炎後對於甲狀腺疾病之影響——一項多中心回顧性世代研究

COVID-19-induced thyroid dysfunction: a multicenter retrospective cohort study

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Background

Several studies have reported endocrine and metabolic abnormalities following the outbreak of coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in December 2019. While previous research has demonstrated a connection between COVID-19 and subsequent thyroid dysfunction, definitive correlations, the timing of disease onset, and specific disease characteristics still lack clarity.

Method

In this international multicenter retrospective cohort study, we recruited approximately 91 million patients from the TriNetX database, a web-based and multi-institutional resource. After propensity score matching, patients were randomly assigned to either the COVID-19 or non-COVID-19 groups. Our primary outcome encompassed the diagnosis of thyroid dysfunction, including hyperthyroidism and hypothyroidism, within a follow-up period of 12 weeks. Subgroup analysis, stratified by age and sex, was also conducted to further characterize the findings.

Result

A total of 8,260,558 patients underwent randomization and 1:1 propensity score matching based on age, sex, race, and comorbidities. After a median follow-up of 12 weeks, our findings revealed that the COVID-19 group exhibited an elevated risk of thyroid dysfunction (hazard ratio, 1.97; 95% confidence interval [CI], 1.92 to 2.02), encompassing both hyperthyroidism (hazard ratio, 1.96; 95% confidence interval [CI], 1.80–2.13) and hypothyroidism (hazard ratio, 1.98; 95% confidence interval [CI], 1.93–2.03). In the subgroup analysis, stratified by age and sex, the COVID-19 group also demonstrated a significantly increased risk of developing thyroid dysfunction.

Conclusion

In summary, our cohort study revealed that COVID-19 infection is associated with an increased risk of thyroid dysfunctions, including both hyperthyroidism and hypothyroidism, irrespective of age and sex differences.



Oral Presentation 112_O 3

針對接受過內視鏡逆行性膽胰管攝影術治療的總膽管結石患者，分析後續發展出肝膿瘍的臨床表現
- 17年追蹤調查

The Clinical Presentations of Liver Abscess Development after Endoscopic Retrograde
Cholangiopancreatography with Choledocholithiasis: A 17-Year Follow-up

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Background

ERCP, used for choledocholithiasis treatment, carries a risk of pyogenic liver abscess (PLA) due to communication between the biliary system and bowel contents. However, limited data exists on this issue.

Method

We conducted a retrospective case series across multiple centers to evaluate patients who developed PLA after ERCP for choledocholithiasis. Data was obtained from the Chung Gung Research Database (January 2001 to December 2018). Out of 220 enrolled patients, 195 were categorized in the endoscopic sphincterotomy (ES) group, while 25 were in the non-ES group for further analysis.

Results

The non-ES group had significantly higher total bilirubin levels compared to the ES group (4.3 ± 5.8 vs. 1.9 ± 2.0 , $p < 0.001$). Abscess size, location, and distribution (single or multiple) were similar between the two groups. The most common pathogens were *Klebsiella pneumoniae* and *Escherichia coli*. *Pseudomonas* infection was significantly less prevalent in the ES group compared to the non-ES group (3.6% vs. 16.0%, $p = 0.007$). Patients with concurrent malignancies (HR: 9.529, 95% CI: 2.667-34.048, $p = 0.001$), elevated total bilirubin levels (HR: 1.246, 95% CI: 1.062-1.461, $p = 0.007$), multiple abscess lesions (HR: 5.146, 95% CI: 1.777-14.903, $p = 0.003$), and growth of enterococcus pathogens (HR: 4.518, 95% CI: 1.290-15.823, $p = 0.001$) faced a significantly higher risk of in-hospital mortality.

Conclusion

PLA incidence was higher in the ES group compared to the non-ES group following ERCP for choledocholithiasis. Attention should be given to significant risk factors, including concurrent malignancies, elevated total bilirubin levels, multiple abscess lesions, and growth of enterococcus pathogens, to reduce in-hospital mortality.



Oral Presentation 112_O 4

機器學習模型預測顯著肝纖維化於非酒精性脂肪肝疾病之病態肥胖性患者

Machine Learning Model to Predict Significant Liver Fibrosis in Morbidly Obese Patients with Nonalcoholic Fatty Liver Disease

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Background

Non-alcoholic fatty liver disease (NAFLD) is a common and important health problem, affecting a large portion of general population with prevalence estimated to be about 30%, and is still increasing globally^{1,2}. The prevalence is much higher in morbidly obese patients, ranging from 74 to 90%³ with BMI over 35 kg/m². NAFLD is a disease spectrum, from steatosis, non-alcoholic steatohepatitis (NASH), liver fibrosis, to advanced liver fibrosis, or cirrhosis. Liver fibrosis is associated with higher morbidity and mortality if left untreated. To date, liver biopsy remains the gold standard for assessing the severity of liver fibrosis. However, liver biopsy is costly and invasive with a significant risk of complications. As an alternative, combination of non-invasive serum biomarkers, such as Fibrosis-4 score (FIB-4), aspartate aminotransferase/platelet ratio index (APRI), nonalcoholic fatty liver disease fibrosis score, and BARD score, as well as ultrasonography and transient elastography have been utilized to assess the severity of liver fibrosis⁴. However, they have moderate prediction accuracy, and showed limited performance especially in obese patients⁵⁻⁸. Machine learning models for prediction of significant liver fibrosis in morbidly obese patients have not been validated. We aimed to predict significant liver fibrosis using machine learning models in morbidly obese patients undergoing bariatric surgery in this prospective study.

Method

This prospective study involved 194 morbidly obese patients with liver biopsy who underwent laparoscopic sleeve gastrectomy at Taipei Medical University Hospital between September 2016 and October 2018. Inclusion criteria were defined as either aged 20-65 years with BMI over 37.5 kg/m² or BMI over 32.5 kg/m² with comorbidity other than diabetes or BMI over 27.5 kg/m² with poorly controlled diabetes. Exclusion criteria comprised of presence of end organ damage, pregnancy, previous metabolic surgery, prolonged exposure to known hepatotoxins and chronic liver disease of other causes. Collected data included basic demographics, non-invasive serum biomarkers, ultrasonographic fibrosis score, liver stiffness measurement, and histopathologic examination of liver biopsy. The scoring of fibrosis stage is based on SAF score (steatosis, activity, fibrosis)⁹. Significant liver fibrosis was defined as a fibrosis score ≥ 2 . Considering data availability and clinical relevance, the serum biomarkers included in input variables were HbA1c, total cholesterol, aspartate aminotransferase, alanine aminotransferase, platelet count, and prothrombin time international normalized ratio. The other input variables were age, sex, BMI, diabetes status (yes/no), ultrasound fibrosis score, and liver stiffness measurement (LSM). The LSM was examined by transient elastography. The ultrasound fibrosis score was based on a previous



study¹⁰.

Five most commonly used machine learning models were implemented for the prediction of significant liver fibrosis, including the support vector machine (SVM) model, random forest (RF) model, k-nearest neighbor algorithm (KNN) model, XGBoost (XGB) model, and artificial neural network (ANN) model, as Figure 1. An ensemble method (ENS) model of the above 5 MLAs was also utilized. The programming language to implement the machine learning prediction model and the statistical analyses for machine learning models were implemented by Python (ver 3.8) with a Keras (ver 2.11.0) API and a Tensorflow (ver 2.11.0) backend. The 95% confidence intervals and p-values of AUROC of prediction models using APRI, FIB-4 score, US fibrosis score, and Fibroscan-based score were calculated by MedCalc (version 20.218, MedCalc Software, Mariakerke, Belgium).

Results

Of all cohort (n=194), 74 (38.1%) had significant liver fibrosis (\geq F2). The demographics and characteristics of all cohort, F0-F1 (n=120), and F2-F4 cohort (n=74) were listed as Table.1. Of all patients, the mean age was 34.4 years. Eight variables were significantly different between F0-F1 and F2-F4 groups. The ratio of male, DM status, HbA1c, AST, ALT, US fibrosis score and LSM were significantly higher in the F2-F4 cohort, while platelet count was significantly lower in the F2-F4 cohort. Age, BMI, total cholesterol, and PT INR were not significantly different between the F0-F1 and F2-F4 cohort.

Using 12 input variables, the SVM model and the XGB model achieved best performance of liver fibrosis prediction. As presented in Table 2 and Table 3, the validation cohort sensitivity, specificity, accuracy, PPV, NPV and AUROC achieved 73.1%, 75.8%, 74.6%, 70.4% 78.1%, 0.78 [95% CI 0.593-0.792] in the SVM model, 65.4%, 81.8%, 74.6%, 73.9%, 75.0%, 0.77 [95% CI 0.647-0.804] in the XGB model, and 73.1%, 69.7%, 71.2%, 65.5%, 76.7%, 0.70 [95% CI 0.544-0.794] in the RF model. The sensitivity was lower in the KNN model and ANN model, but achieved higher specificity. The validation cohort sensitivity, specificity, accuracy, PPV, NPV and AUROC achieved 34.6%, 87.9%, 64.4%, 69.2%, 63.0%, 0.59 [95% CI 0.493-0.704] in the KNN model, and 46.2%, 75.8%, 62.7%, 60.0%, 64.1%, 0.64 [95% CI 0.346-0.650] in ANN model, respectively. The performance was mostly better in the training cohort than in validation cohort. The ensemble method (ENS) model combined the 5 ML models with voting and achieved training/validation cohort sensitivity, specificity, accuracy, PPV, and NPV of 75.0/61.5, 85.1/84.8%, 81.5/74.6%, 73.5%/76.2%, 86.0%/73.7%, respectively. The ROC curves of ML models were listed as Figure 2. The values, 95% confidence intervals, and p-values of AUROC of machine learning models were listed in Table 5. Sensitivity, specificity, accuracy, PPV, and NPV of other non-invasive tests using non-ML algorithms for significant liver fibrosis were listed in Table 4.

Conclusion

In this prospective study, we are first to utilize machine learning models to predict significant liver fibrosis (\geq F2) in morbidly obese patients undergoing bariatric surgery with input variables comprised of basic demographic data, non-invasive serum biomarkers, US fibrosis score, and LSM. We achieved good prediction performance of validation cohort especially in the SVM model and XGBoost model. Our study demonstrated that machine learning models can be implemented to predict significant liver fibrosis with high diagnostic performance in this patient population.



In conclusion, we developed and validated machine learning models especially the SVM and XGB models that were accurate for predicting significant liver fibrosis in morbidly obese patients using basic demographic data, non-invasive serum biomarkers, ultrasound fibrosis score and liver stiffness measurement. The presented machine learning prediction models may serve as a tool to screen and exclude significant liver fibrosis, which we believe to contribute to lower the associated morbidity and mortality in this patient population.

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Oral Presentation 112_O 5

煙氯奎寧降低 C 型肝炎患者罹患肝細胞癌之風險：回溯性研究

Hydroxychloroquine Reduced the Risk of Hepatocellular Carcinoma in patients with hepatitis C virus infection: A retrospective cohort study

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Background

Chronic hepatitis C virus (HCV) infection is one of the leading causes of hepatocellular carcinoma (HCC) worldwide. Hydroxychloroquine (HCQ) is a medication primarily used to treat malaria and autoimmune diseases such as rheumatoid arthritis and lupus. However, recent studies have suggested that it may also have anti-cancer properties based on autophagy and non-autophagy-related mechanisms. This study aims to investigate the association between Hydroxychloroquine use and the risk of hepatocellular carcinoma in patients with chronic hepatitis C virus infection

Method

Patients with HCV infection were enrolled from Taiwan's National Health Insurance Research Database and examined for the period from January 1, 2006, to December 31, 2016. We used the Kaplan-Meier method and Cox proportional hazards regression to evaluate the association between HCQ use and HCC risk

Results

We included patients with HCV infection (n=139,263) and individual matching with 1:10. There were 1,037 cases of HCC in the HCV cohort during a follow-up period. Among the 1,598 patients using HCQ (defined as ≥ 28 cumulative defined daily doses [cDDD]), 62 had HCC. Among the 15,980 patients not using HCQ (≤ 28 cDDDs), 975 were diagnosed with HCC. Patients with HCV who used HCQ exhibited significantly lower risk of HCC relative to patients who did not use HCQ, with their adjusted hazard ratio(aHR) being 0.68 (95% CI, 0.51~0.92). Furthermore, a dose-response relationship between HCQ use and HCC risk was no observed. Additionally, the use of concurrent medications, such as H1-antihistamine (aHR;0.74 [CI 0.59~0.93]), nonsteroidal anti-inflammation drugs (aHR; 0.60 [0.48~0.76]) and statin (aHR;0.38 [0.32~0.46]), was associated with a lower HCC risk.

Conclusion

HCQ use may reduce the risk for HCC among patients with HCV infection. This finding provides important insights into the potential benefits of HCQ using in preventing HCC in patients with chronic HCV infection. Further studies are needed to confirm these findings and explore the underlying mechanisms.



Oral Presentation 112_O 6

Bioactivity of pleural fluid in improving early wound healing with keratinocyte and fibroblast proliferation through PI3K/Akt/pS6 and VEGFR2 signaling

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Abstract

Impaired wound healing presented as an unmet need in cancer patients undergoing chemotherapy or radiotherapy. Abundant growth factors appear in pleural fluid from heart failure and lung cancer patients. Our previous study of lung cancer-associated pleural fluid (LCPF) demonstrated its propensity to promote endothelial proliferation, migration, and angiogenesis that was also a crucial feature during cutaneous wound healing. As a result, the current study aimed to investigate the effect of pleural fluid on cutaneous wound healing in vitro using HaCaT keratinocytes and in vivo by full-thickness skin wound model. For the patient with heart failure (HFPP) or lung cancer (LCPF), pleural fluids were collected through thoracocentesis. Both HFPP and LCPF were sequentially centrifuged and filtered to reach cell-free status. Treatment with HFPP and LCPF homogeneously induced HaCaT proliferation with cell cycle progression, migration, and MMP2 upregulation. Western blotting revealed increased PI3K/Akt phosphorylation and VEGFR2/VEGFA expressions in HaCaT cells. When treatment with PI3K inhibitor, LCPF-induced keratinocyte proliferation was attenuated with decreased pS6 level. By applying the VEGFR2 inhibitor, LCPF-induced keratinocyte proliferation was ameliorated with pS6 and MMP2 downregulation. Moreover, HaCaT cultured with LCPF presented more reticular pattern of ZO-1 and F-actin staining. The effect of LCPF-induced cell junction rearrangement was disrupted by cotreatment with the VEGFR2 inhibitor. Next, surgical excision wound model of mice was applied to evaluate the wound healing potential of LCPF-based wet dressing. Compared with 0.9% saline dressing, LCPF as dressing material significantly accelerated wound closure and re-epithelization under gross examination. The histological section showed increased epithelial tongue length and neo-epidermis thickness in the LCPF-treated group. Furthermore, LCPF treatment activated basal keratinocytes at the wound edge with Ki-67, VEGFA, and MMP2 upregulation. Our preliminaries provided the benefit of wet dressing with pleural fluid to improve cutaneous wound healing through enhanced re-epithelization and disclosed future autologous application in cancer wound treatment.



Oral Presentation 112_O 7

維生素 D 缺乏症與結核病及隨後的長期死亡風險之相關性：美國以群體為基礎之世代研究
Association of vitamin D deficiency with risk of tuberculosis and subsequent long-term mortality: a population-based cohort study in the United States

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Background

Vitamin D deficiency is a risk factor for a variety of chronic diseases, including cardiovascular disease, diabetes, cancer, and neuropsychiatric disorders. Additionally, several studies have shown an association between low vitamin D levels and the risk of respiratory infections and subsequent short- and long-term mortality. However, little is known about the relationship between vitamin D deficiency and tuberculosis. Therefore, we conducted a population-based cohort study to evaluate the association between vitamin D deficiency and the risk of tuberculosis and subsequent long-term mortality using a nationally representative sample in the United States (U.S.).

Method

The study population was recruited from 2011-2012 cycle of the U.S. National Health and Nutrition Examination Survey (NHANES). We included 5,225 adult participants aged ≥ 18 years who were tested for vitamin D levels and tuberculosis. Serum levels of vitamin D was measured by high performance liquid chromatography-tandem mass spectrometry (HPLC-MS/MS). Because of conflicting definitions of vitamin D deficiency, we defined vitamin D deficiency as 25-hydroxyvitamin D₃ levels < 50 nmol/L and severe deficiency as < 30 nmol/L based on the Endocrine Society. Tuberculosis was defined as induration > 10 mm on tuberculin skin test (TST) or a positive QuantiFERON®-TB Gold-In-Tube (QFT) test. The survival status was ascertained by linking NHANES data to death records from the National Death Index through probabilistic matching and death certificate review. Participants were followed from the NHANES baseline interview until the participant's death or end of follow-up date (December 31, 2019), whichever came first.

Results

Among the 5,225 participants, 698 was identified as having tuberculosis. We observed that individuals with tuberculosis tended to be male, older in age, single, higher in prevalence of diabetes and hypertension, lower in vitamin D levels, and lower in education attainment and family income. By multiple logistic regression, we showed that vitamin D deficiency was associated with 23% increased risk of tuberculosis after adjusted for age, sex, race, body mass index (BMI), diabetes, family income, marital status, and survey month (dichotomized into November 1 through April 30 and May 1 through October 31 as reported by NHANES). For every 10 nmol/L increase in vitamin D levels, the risk of tuberculosis decreased by 7% (adjusted odds ratio: 0.93, 95% CI: 0.89-0.96, $p < 0.001$).

Among the 698 participants with tuberculosis, 81 individuals died during a median follow-up of 97 months (interquartile range: 90-102 months), a death rate of 12.6 per 10,000 person-months. By Kaplan-Meier method, we showed that vitamin D deficiency was associated with an increased risk of death in those aged ≤ 65 and > 65 years (both $p < 0.05$ by Log Rank



test). By multivariable Cox regression with adjustment for age, sex, race, BMI, survey month, diabetes, hypertension, cardiovascular disease, previous stroke, smoking status, educational level, marital status, and family income, we showed that the risk of death was 2.1 (95% CI: 1.25-3.56, $p < 0.01$) and 2.4 (95% CI: 1.34-4.56, $p < 0.01$) times higher in individuals with vitamin D deficiency and severe vitamin D deficiency, respectively.

Conclusion

Vitamin D deficiency was associated with an increased risk of tuberculosis in the U.S. general population. Additionally, in individuals with tuberculosis, vitamin D deficiency was a predictor of long-term mortality. However, the causal relationship needs to be examined.



Oral Presentation 112_O 8

利用卷積神經網絡預測食道巴瑞特症的內視鏡方法

Utilizing Convolutional Neural Networks for Predicting Barrett's Esophagus in Endoscopy Methods

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Background

Barrett's esophagus, which has increased in prevalence in both Western and Asian countries, is a precursor for esophageal adenocarcinoma. There is still a gap in the detection rates between endoscopy and histological Barrett's esophagus. It is uncertain whether this gap comes from sampling methods or detailed differences that are difficult for clinicians to manually detect in images. Here we attempted to train our artificial intelligence system with images of endoscopic Barrett's esophagus and tested the system with the images of histological Barrett's esophagus.

Method

Endoscopic narrow-band images were collected from Chung Shan Medical University Hospital and Changhua Christian Hospital, resulting in 724 cases, with 86 patients having complete pathological results. Three senior endoscopists, who were instructing physicians of the Digestive Endoscopy Society of Taiwan, independently annotated the images in the development set to determine whether each image was classified as an endoscopic Barrett's esophagus. The test set consisted of 160 endoscopic images of 86 cases, and the categorization was based on the histological results.

Results

Six pre-trained models were compared, including EfficientNetV2B1 (Accuracy [ACC]: 0.76), EfficientNetV2B2 (ACC: 0.85), EfficientNetV2B3 (ACC: 0.81), DenseNet201 (ACC: 0.71), ResNet50 (ACC: 0.73), and VGG16 (ACC: 0.44). Ultimately, EfficientNetV2B2 was selected as the backbone architecture for further evaluation. In the final test with images of histological Barrett's esophagus, the artificial intelligence system correctly identified 66 out of 70 cases that had Barrett's esophagus and 85 out of 90 cases that did not have Barrett's esophagus, resulting in 94.37% accuracy.

Conclusion

Our artificial intelligence system, which was trained by narrow-band images of endoscopic Barrett's esophagus, can predict endoscopic images of histological Barrett's esophagus well. The accuracy, sensitivity, and specificity are 94.37%, 94.29%, and 94.44%, respectively.



Oral Presentation 112_09

口服抗病毒藥物對於慢性腎臟病的非住院 COVID-19 患者之臨床效益

Clinical effectiveness of oral antiviral agents for treating non-hospitalized COVID-19 patients with chronic kidney disease

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Background

Chronic kidney disease (CKD) affects 8-16% of adults worldwide and poses a heightened risk of complications like cardiovascular disease and infections. CKD patients are at an elevated risk for severe COVID-19 due to compromised immunity. Antiviral drugs like nirmatrelvir plus ritonavir and molnupiravir have shown promise in reducing hospitalization and death in mild-to-moderate COVID-19 cases, but their effectiveness in CKD patients remains uncertain, prompting this real-world study for practical guidelines.

Methods

This retrospective cohort study used the TriNetX research network to identify patients with stage 3–5 CKD and end-stage kidney disease (ESKD) who experienced non-hospitalized COVID-19 between January 1, 2022, and May 31, 2023. The propensity score matching (PSM) method was used to match patients receiving oral antiviral agents (NMV-r or MOV; antiviral group) with those who did not receive oral antiviral agents (control group). The primary composite outcome was the cumulative hazard ratio (HR) for all-cause hospitalization or death during the 30-day follow-up period.

Results

Two cohorts of 3,485 patients, each with balanced baseline characteristics, were identified using the PSM method. During the follow-up period, the antiviral group exhibited a lower incidence of all-cause hospitalization or mortality (3.59% [$n = 125$] versus 9.23% [$n = 322$]; HR, 0.385; 95% confidence interval [CI], 0.313–0.473) than the control group. Compared with the control group, those receiving antiviral agents were associated with a lower risk of all-cause hospitalization (HR, 0.430; 95% CI, 0.346–0.535) and all-cause mortality (HR, 0.232; 95% CI, 0.135–0.399). The beneficial effects of antiviral agents were consistent in the majority of subgroup analyses for sex, age, vaccination status, type of oral antiviral agent, and CKD stage.

Conclusion

Oral antiviral agents could be associated with lower rates of all-cause hospitalization or death among non-hospitalized COVID-19 patients with CKD.



Oral Presentation 112_O 10

生物可吸收性抗菌袋用於預防心臟植入式電子裝置感染之效果分析

Clinical effectiveness of oral antiviral agents for treating non-hospitalized COVID-19 patients with chronic kidney disease

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Background

Cardiac implantable electronic device (CIED) infection is one of the most serious complications of CIED therapy associated with increased morbidity, mortality, and healthcare cost. The use of TYRX Absorbable Antibacterial Envelope has been reported to reduce the risk of CIED infection without an increased risk of additional complications. To investigate the real-world efficacy on Taiwanese patients, we retrospectively review the outcomes of CIED patients with and without envelope use during procedure.

Methods

All 456 patients underwent CIED procedure since January 2022 to June 2023, including initial implantation, generator replacement, upgrade, or revision. 154 cases were treated with TYRX in consideration of medical condition, operator's choice, or financial availability. The TYRX group and the other 302 cases as control group both received our standard-of-care infection prophylaxis. Patient demography and CIED complication during serial clinical follow-ups were analyzed.

Results

Both groups demonstrate comparable characteristics including age, sex, BMI, CIED type, and left ventricular ejection fraction (Table 1). The TYRX group consists of more dialysis (TYRX vs Control: 14% vs 7%, $p=0.015$) and anticoagulant use (TYRX vs Control: 36% vs 17%, $p=0.048$) patients with longer procedure time (TYRX vs Control: 83.42 ± 40.3 vs 70.36 ± 31.7 minutes, $p=0.0002$) needed. Major CIED-related infections (defined as those resulted in CIED system removal) occurred in 0 TYRX patients and 4 control patients (0% vs 1.3%, $p=0.0632$). There were no any lead dislodgment complications in TYRX group, but 3 cases happened in control group (0.99%). No cases reported allergic reactions to the components of TYRX.

Conclusions

In our study, the TYRX group consists of subjects with more high risk of CIED infection. Even though the bio-absorbable antibiotic envelope demonstrated its lower occurrence of CIED related infection without an increased risk of system or procedure related complications.



Oral Presentation 112_O 11

比較 COVID-19 期間接受急性心臟後期照護監督式到院與居家復健的臨床效果

Supervised Rehabilitation for Acute Heart Failure During COVID-19: Hospital vs. Home-based Approaches in Post-Acute Care Program

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Background

Heart failure (HF) is a culmination of various cardiovascular ailments, and its high mortality rate poses significant challenges for healthcare systems. With the emergence of the COVID-19 pandemic, traditional rehabilitations with hospital-based exercise training (ET) for HF patients became challenging, necessitating a shift to innovative home-based ET methods. We developed the series of home-based ET in the rehabilitation program during the pandemic. This study aimed to compare the outcomes of supervised home-based and hospital-based rehabilitation in patients with acute HF.

Methods

We conducted a retrospective cohort study from February 2019 to January 2022 at a medical center in southern Taiwan. Patients with a left ventricular ejection fraction (LVEF) $\leq 40\%$ were enrolled in a post-acute care (PAC) program for HF. They were segregated into home-based and hospital-based rehabilitation groups based on individual preferences. The home-based ET strategies included tele-rehabilitation, wearable fitness trackers, mobile health apps, interactive online platforms, remote monitoring, digital health diaries and feedback loops. The primary outcomes were changes in LVEF, six-minute walking test (6MWT), and Minnesota Living with Heart Failure Questionnaire (MLHFQ) scores after a six-month rehabilitation period.

Results

A total of 128 patients were included in the analysis, with 80 in the home-based group and 48 in the hospital-based group. Both groups showed significant improvements in LVEF, 6MWT, and MLHFQ scores after the rehabilitation period. Specifically, the home-based group saw an increase of 21.9% in LVEF, 134.0 meters in 6MWT, and a decrease of 16.3 points in MLHFQ. The hospital-based group saw an increase of 20.6% in LVEF, 160.7 meters in 6MWT, and a decrease of 26.0 points in MLHFQ. The difference in MLHFQ was significantly different between the two groups ($P=0.005$). Subgroup analyses further dissected the association between the three outcomes and relevant variables. Despite the comparable outcomes in the analyses, male patients in the hospital-based rehabilitation were likely to have better improvement in MLHFQ (differences 13.3, 95% confidence interval between 5.7 and 20.9, $P=0.03$ for interaction).

Conclusion

Both supervised home-based and hospital-based rehabilitations yielded significant



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improvements in LVEF, exercise capacity, and quality of life in acute HF patients. Despite the challenges posed by the COVID-19 pandemic, home-based rehabilitation, augmented with modern communication technologies, appears to be an effective alternative to traditional hospital-based rehabilitation. However, the specific advantages and applicability of each approach need further evaluation in larger and more diverse cohorts.



Oral Presentation 112_O 12

類風濕性關節炎之光譜學檢測與機器學習應用

Spectroscopic detection and machine learning application of rheumatoid arthritis

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Background

Rheumatoid arthritis (RA) is an autoimmune disease with a gradual onset, leading to chronic inflammation and damage to multiple joints. Common symptoms include joint pain, swelling, warmth, and morning stiffness, often accompanied by joint deformities and involvement of other organs. Uncontrolled RA can cause irreversible damage to cartilage and bones, as well as harm to organs like the lungs and kidneys. Early RA diagnosis is crucial to reduce morbidity and mortality. However, current diagnostic criteria, like the ACR/EULAR classification, have limited sensitivity (82%) and specificity (61%). Early-stage RA patients may not seek help due to atypical symptoms and a short disease duration, missing the chance for early diagnosis. A more sensitive and specific diagnostic method is needed.

Raman spectroscopy, based on light-molecule interactions, offers a way to analyze molecular information in samples by detecting small shifts in scattered photons' frequencies. Utilizing machine learning algorithms, we aim to differentiate RA patients' serum spectra from non-RA patients', providing a novel diagnostic approach for RA.

Method

We recruited 100 patients with RA who had no history of other autoimmune diseases as cases and 100 patients with osteoarthritis who had no history of autoimmune diseases or elevated levels of serum rheumatoid factor (RF) or anti-cyclic citrullinated peptide antibody (ACPA) as controls. We collected their blood less than 10 ml. The serum was extracted after blood centrifugation and checked for the levels of RF, ACPA, and Raman spectra. We collected 5 Raman spectra from the 3D Laser Raman Microspectroscopy Nanofinder 30 (Tokyo Instruments Inc.) from each patient's serum sample with a 632.8nm laser source. Each spectrum was preprocessed by the arPLS algorithm for background removal and then normalized by vector normalization. Then the spectra for each patient are averaged and discriminated by SVM with RBF kernel function and hyperparameters $C=10$ and $\gamma=100$.

Results

We evaluated our performance by 10-fold cross-validation. As a result, the SVM algorithm achieved 95.8% of accuracy, 98% of sensitivity, 93% of specificity, and 96% of precision. Furthermore, the p-value of permutation test was 0.009, indicating that the Raman spectra were significantly different between the patients of different groups.

Conclusion

With the supervised learning model, serum spectra of cases and controls can be distinguished as a diagnostic method with better sensitivity and specificity than the ACR/EULAR classification criteria. Especially, this diagnostic method does not rely on an experienced rheumatologist with complete history taking skills or the accuracy of the patients' description of their medical history. In the future the benefits of early diagnosis and early treatment may indeed be achievable through simply little amount of blood.



Oral Presentation 112_O 13

探討第一型升糖素胜肽受體致效劑及鈉-葡萄糖共同轉運器-2 抑制劑和重大不良心血管事件的相關性:一篇網路統合分析

Association Between Glucagon-Like Peptide 1 Receptor Agonists and Sodium-Glucose Co-Transporter-2 Inhibitors with Major Cardiovascular Events: A Network Meta-Analysis

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Background

Type 2 diabetes mellitus is prevalent in modern society and strongly associated with Atherosclerotic cardiovascular disease(ASCVD), which is linked to a worse prognosis. Traditional antidiabetic drugs mainly focus on glycemic control rather than cardiovascular outcomes. Fortunately, novel diabetic medications, sodium-glucose cotransporter 2 inhibitors(SGLT-2i), and glucagon-like peptide-1 receptor agonists(GLP-1RA), showed promising effects on cardiovascular outcomes in recent trials. A meta-analysis revealed that SGLT2i and GLP-1RA are correlated with better cardiovascular outcomes in patients with or without diabetes mellitus. Nevertheless, which population benefits the most from the medications is ambiguous. Furthermore, there have been new trials published in this field lately. To fulfill the unmet need, this study performed a network meta-analysis to assess the association between the cardiovascular benefits of the SGLT-2i, GLP-1RA, and the characteristics of the patients to explore who benefits the most from these novel agents.

Methods

We systematically searched literature in PubMed, EMBASE and Cochrane library from inception to Apr.13.2023. The search was limited to cardiovascular outcome trials evaluating diabetes drugs, including SGLT-2i, GLP-1RA, or Dipeptidyl peptidase 4 inhibitors (DPP4-i) classes in patients with or without diabetes. Article types were restricted to randomized control trials (RCTs) and published in English. The primary study endpoints focused on major cardiovascular events (MACE). Our approach entailed the utilization of a frequentist random-effects network meta-analysis (NMA) framework, which incorporated both direct and indirect comparisons. Risk ratios (RRs) and their corresponding 95% confidence intervals (CIs) were computed, followed by the ranking of the relative probabilities concerning MACE rates associated with all medications in the context of the specified outcomes, employing the Surface Under the Cumulative Ranking Curve (SUCRA) methodology. Subsequently, subgroup analyses were conducted to evaluate patients with multiple comorbidities, including diabetes, ASCVD, and chronic renal failure.

Results

A total of 32 RCTs with 252,821 patients were eligible for the analyses. Our result showed that in patients with diabetes and established ASCVD, both GL-P1RA and SGLT-2i are associated with lower MACE than placebo (RR 0.87, 95% CI 0.82-0.92 and RR 0.90, 95% CI 0.84-0.97, respectively). In individuals who had diabetes, ASCVD, and chronic renal failure, GL-P1RA and SGLT-2i still had highest probability of being the best medication (SUCRA: GLP-1RA 0.7392, SGLT-2i 0.5800, placebo 0.5350, DPP4i 0.1459). Due to the relatively small sample size, GL-P1RA and SGLT-2i did not demonstrate statistically significant differences in



relative risk (RR) compared to the placebo (RR 0.93, 95% CI 0.72-1.2 and RR 0.98, 95% CI 0.82-1.18, respectively).

Conclusion

In patients with diabetes and ASCVD, SGLT2i and GLP-1RA are superior to placebo in terms of MACE. GLP-1RA might be a better option compared to SGLT-2i, DPP4i or placebo in individuals who had diabetes, ASCVD, and chronic renal failure.



Oral Presentation 112_O 14

探討台灣南部某醫學中心使用 Per-oral endoscopic myotomy (POEM)治療 Chicago classification 分型 type I 和 type II achalasia 之術後短期結果比較：一項單中心回顧性研究。

Comparative Outcomes of POEM Treatment in Type I and Type II Achalasia: A Single-Center Retrospective Study in Southern Taiwan

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Background

Achalasia is a rare esophageal motility disorder characterized initially by occasional reflux symptoms, progressing to dysphagia, chest pain, vomiting, and significant weight loss. These symptoms severely impact patients' quality of life. Peroral endoscopic myotomy (POEM) has emerged as an effective, minimally invasive surgical intervention. However, limited data exist comparing the efficacy of POEM between Chicago Classification subtypes Type I and Type II achalasia in terms of Eckardt score, surgical duration, hospital stay, adverse events, and weight changes. This study aims to fill this gap.

Method

This single-center retrospective study evaluated patients diagnosed with achalasia (Eckardt score ≥ 4) at Kaohsiung Chang Gung Memorial Hospital from January 2020 to June 2023. We assessed high-resolution manometry (HRM) and Eckardt scores 6 months post-POEM. The primary outcome measures included Eckardt score, upper esophageal sphincter (UES) mean basal pressure, lower esophageal sphincter (LES) mean basal pressure, and integrated relaxation pressure (IRP). Secondary outcomes included one-year postoperative weight gain, operation time, length of hospital stay, and adverse event rates.

Results

Among 39 patients who underwent POEM, 17 had Type I and 22 had Type II achalasia. The median follow-up was 3.53 months (range 1.96-5.96). In the primary analysis, both Type I and Type II achalasia subtypes demonstrated statistically significant reductions in individual Eckardt score components—namely weight loss, dysphagia, retrosternal pain, and regurgitation—post-POEM intervention ($p < 0.001$ for all metrics). Nonetheless, the intergroup comparison revealed no statistically significant differential in the magnitude of Eckardt score reduction between the two subtypes ($p = 0.458$). Post-POEM, both groups exhibited statistically significant weight regain (Type I: $p = 0.023$, Type II: $p = 0.03$); however, the intergroup variance in the extent of weight modification was not statistically significant ($p = 0.693$). In terms of hospitalization duration, patients with Type II achalasia had significantly shorter stays as compared to their Type I counterparts ($p = 0.017$). Additionally, a marked decrement in LES basal pressure was observed in the Type I cohort post-POEM ($p = 0.007$), a trend not reaching statistical significance in the Type II cohort ($p = 0.051$).

Conclusion

POEM effectively improves Eckardt scores and weight gain in both Type I and Type II achalasia, with no significant differences in these primary outcomes between the subtypes. However, Type II patients experienced shorter hospital stays, suggesting quicker postoperative recovery. The study's limitations include a small sample size and its single-center design, warranting further research with larger cohorts.



Oral Presentation 112_O S

2023 年烏克蘭義診臨床報告

Clinical Report on 2023 Ukraine Medical Mission

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Background

俄烏戰爭從 2022 年 2 月 24 日開始，到今年 9 月 24 日已經 1 年 7 個月，戰爭還在繼續中。由於戰爭中，許多醫師被調派到烏克蘭東部和南部的戰區，救助傷患，所以烏克蘭有需要醫療的人道救援。今年北美洲台灣人醫師協會 NATMA 發起到烏克蘭義診的活動。

並邀請國內的醫療人員參加，聯合組成台灣隊，共襄盛舉。也能夠具體呈現 Taiwan can help 的精神。我們願意將這次到烏克蘭義診活動的經驗和醫界同仁分享，可作為未來有意願前往醫療的同仁參考。

Materials and Methods

1. 正式的烏克蘭義診活動是從 09/02 到 09/08。

事先義診地點的選擇，病患的登記，藥品準備，翻譯、交通、住宿、膳食等工作都是由當地烏克蘭 Dr. Rudolph Myhovyc 所領導的烏克蘭基督教醫療協會(Christian Medical Association, CMA) 來負責協調和安排。我們台灣隊就配合他們的安排來做義診的服務。但是活動結束後，所花的費用由我們台灣隊來支付。

2. 這次送愛心到烏克蘭的台灣醫療隊，一共有 14 位成員，其中醫師有 10 人，分內科和外科兩組。內科：建立行動醫療站(Mobile clinic)，看門診，有一處是到醫院會診。

地點：門診有 Kovel 和 Rivne 二個城市附近村落。醫院會診是在 Skalat 市的社區醫院。

科目：腸胃肝膽內科、胸腔內科、耳鼻喉科、皮膚科、復健、針灸推拿、／衛生教育等。

看病時，有翻譯員來協助。這些翻譯員都是醫學院五、六年級的學生，利用假期來協助義診活動。所以診察溝通上沒有什麼問題。透過翻譯，將整個病史詢問、理學檢查、診斷和處置完成。看病，不求快，一次看診，約 15-20 分。一位醫師一天下來，大約看 20 幾個病人。

Results

1. 腸胃科韓明榮醫師的報告：

在我的門診一共看了 74 位病人，男女的比例，= 17:57，年齡分布: 57 (3-82) N= 68。

疾病的型態: 和臺灣所見的類似。最常見的疾病是; 高血壓、糖尿病、腦中風、心肌梗塞、高血脂、急性胃炎、膝關節退化性疾病、頭痛、焦慮等等，很多病都和肥胖有關係。

另外，有 2 個病例是和這次俄烏戰爭有相關: 第一個是一位婦女由於先生在前線陣亡，引起她產生創傷後壓力症候群；另外是一位母親，她的兒子在軍中服務，讓她很擔心，產生一些身心症狀，例如：頭痛、焦慮、睡不著等等。請見表一。

當地醫院方面也要求有學術交流的活動。我也利用這個機會分享登革熱的臨床診斷經驗，希望烏克蘭如果有境外移入的病例可以及早發現、馬上治療。

2. 呼吸道內科許文瑞醫師的報告：

所看的患者從 1 歲到 70 歲不等。看了 3 位肺結核病患，小孩與成人都有。他們曾經在醫院或家庭醫師治療追蹤中。小孩得肺結核是因家人傳染。至於憂鬱症、肥胖、高血壓、心臟衰竭、慢性阻塞性肺病、氣喘很常見而且沒有控制好，不知道是病人順從性不好，或是沒錢買藥。其間，去居家探訪一位末期的慢性阻塞性肺病的病人。病人是 67 歲，男性，平常只有使用 albuterol nebulizer and atrovent inhaler。於一個月前，因肺炎住院。出院後病人也體力衰弱無法到醫院看診，且有重度憂鬱症的傾



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向。他目前接受類固醇及口服抗生素治療。我建議慢性阻塞性肺病的維持治療用 Trelegy Ellipita。我從美國門診帶來的 sample drug 贈送給他們。對於末期的慢性阻塞性肺病患者身體和心理的復健，以及營養補給很重要。

Table 1: 9/7 Thursday and 9/8 Friday, 2023
At Rivne city, in my OPD service. Patient number: 39 in 1.5 days

| No. | Sex | Age | BW, Kg | Height | Diagnosis | Remarks |
|-----|----------|-----|--------|--------|-------------------------------------|----------------------------|
| 9/7 | Thursday | | | | | |
| 1 | F | 82 | | | Umbrical nidus infection | |
| 2 | F | 60 | | | CHC, LC, splenomegaly | |
| 3 | F | 29 | 72 | 164 | PTSD, war related | Husband died |
| 4 | F | 62 | 99 | | Old MI, T2DM | |
| 5 | F | 73 | 77 | | H/T, T2DM, Old MI | |
| 6 | F | 72 | 90 | | Obesity, H/T, T2DM, Sciatica | |
| 7 | F | 59 | 65 | | Stress, anxiety, war related | Son in the Army |
| 8 | F | 41 | 95 | | Obesity, GBS | |
| 9 | F | 59 | | | Bronchitis, bacterial | |
| 10 | F | 74 | | | CAD, CHF | |
| 11 | F | 54 | 98 | | Obesity, H/T, Hyperlipid, Dizziness | |
| 12 | F | 62 | 92 | | Obesity, DJD of Knee Joints, GBS | |
| 13 | F | 70 | 90 | | Obesity, Sciatica, T2DM, H/T | |
| 14 | M | 64 | | | COPD | Heavy smoker |
| 15 | F | 43 | | | Ac Gastritis | |
| 16, | M | 42 | | | GU nephropathy | |
| 17 | F | 63 | 77 | | H/T, Tension headache | |
| 18 | F | | | | Hand tremor | |
| 19 | F | 50 | | | Skin infection | |
| 20 | M | 57 | 78 | | Brain seizure | |
| 21 | F | 39 | | 168 | Pregnancy, anemia | |
| 22 | | 73 | 86 | 165 | Ac gastritis | |
| 23 | M | 80 | | 174 | Old CVA, Sciatica, CHF | |
| 24 | F | 81 | 90 | 170 | H/T, Arrhysmia, Insomnia | |
| 25 | F | 82 | 58 | | Ac gastitis with GERD | |
| 26 | F | 60 | 72 | | Rheumatoid Arthritis | Naproxin, Prednisolon |
| 27 | F | 13 | 38 | 157 | Autoimmune disease, Pain syndrome | Check ANA |
| | | | | | | |
| 9/8 | Friday | | | | | |
| 1 | M | 50 | 95 | | Ac Gastritis, No GBS | Abdominal Ultrasound study |
| 2 | F | 62 | 95 | 165 | Obesity, Old MI, H/T | |
| 3 | F | 61 | 73 | 160 | Old MI with By pass, Gout, | |
| 4 | F | | | | Hypothyroidism | Myxoedema |
| 5 | M | 39 | 80 | 176 | Ac Gastritis | |
| 6 | F | 66 | 70 | 164 | CAD, Old MI | |
| 7 | M | 69 | 75 | 170 | Migraine | |
| 8 | F | 77 | 71 | 158 | Sciatica, CAD, H/T, DJD of Knee. | |
| 9 | F | 56 | 85 | 168 | Obesity, T2DM, DJD, Knee pain | |
| 10 | F | 61 | 74 | | Tension Headache | |
| 11 | F | 74 | 45 | 160 | Anemia, TG, DJD, Knee pain | |
| 12 | F | 74 | 60 | 154 | Allergic bronchitis | |

Discussion



1. 建立友誼，做好國民外交：和烏克蘭 Dr. Rudolph Myhovyc 的基督教醫療協會團隊互相合作。
2. 在門診方面，我們台灣隊用專業和愛心為患者看病，在醫院會診方面，也和當地的醫療同仁交換意見，給病患最好的照顧。
3. 我們也到 Ternopil 國立醫學大學，參觀模擬教育中心，也了解戰爭之後，對他們最大的衝擊是：學校的預算大為縮減，因為外國的學生從 3 千多人減少剩下 3 分之 1。
4. 任務完成，平安歸來。在烏克蘭西部的義診活動相對安全。義診期間，曾經遇到兩次空襲警報，平安渡過。
5. 烏克蘭他們本來的醫療體系有一定的水準。但是，受到戰爭影響，醫療體系功能發揮受限。烏克蘭市民對於我們冒著戰爭的風險，來做義診的工作，他們感到溫馨、鼓勵和感謝。
6. 目前戰爭中，烏克蘭很需要心理諮商和治療師。希望臺灣有義診醫療團繼續前往協助。
7. 有關烏克蘭肺結核的流行病學和傳染病防治，尚有待進一步了解。
8. 烏克蘭醫療系統是沿襲蘇聯的社會保險醫療。病人自己保存病歷。一般病人在第一線的家庭醫師治療，較特殊的疾病要到醫院才能看到專科醫師，很不方便。一般藥物包括在醫療看診，但到外面藥房就要自費。
9. 最後，期待戰爭趕快結束，烏克蘭人勝利，不要再過困苦、不安的日子。