Sepsis and infections 2

000113 - A Novel Technique of Rapid Antibiotic Susceptibility Testing based on Surface-Enhanced Raman Spectroscopy with High Successful Rate

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Introduction

Timely effective antibiotic usage is crucial for infection control. However, cultured-based microbiological diagnosis are time consuming, leading to poor clinical outcomes and overuse of antibiotics. In our previous study, a rapid microbiological analytic platform based on surface-enhanced Raman spectroscopy (SERS) for antibiotic susceptibility test (AST) was established.

Objectives

Validation and reliability of the SERS-based AST prototype system were tested with various clinical blood-culture bacteria as well as antibiotics of diverse categories.

Methods

After pretreatment of 60 selective positive blood-culture mixtures from patients with bacteremia (20 samples for each *E. coli*, *E. cloacae* and *K. pneumonia*), bacterial suspension samples were recovered. Two-hr antibiotic treatment was followed and then SERS measurements was done on SERS-active substrates made of Ag nanoparticle array. Specific Raman shift for each bacteria was designated as the SERS biomarkers for AST.

Results

Significant signal reduction of bacterial SERS biomarker after antibiotic treatment was noted in susceptible strains, while it remained relatively invariant for all tested drug concentrations in resistant strains. The AST results obtained by SERS-based method were highly consistent (90%) with those by VITEK® 2 automatic system, which is commonly adopted in modern hospitals for clinical microbiological diagnosis. For high clinical interest, we further focused on 13 cases in which the primary laboratory results were converted by the Advanced Expert System™ (AES™) of VITEK® 2, a validation system referring built-in large complex databank. Compared with results by agar dilution, the gold standard of AST, there was 85% agreement of final reports by the VITEK® 2-AES™ system with one major error and one minor error (intermediate to resistant), while SERS-based AST had four minor errors (resistant to intermediate).

Conclusion

A rapid AST protocol based on SERS was successfully tested on 60 blood culture samples of *E. coli, E. cloacae* and *K. pneumoniae*. The results are highly in accord with those outputted from VITEK® 2 automatically microbiological diagnostic system, including 13 AES™-converted cases.

000121 - Temporal trend of microbiological profiles among patients with bloodstream infections - a US-based nationwide study

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Introduction

Blood stream infection (BSI) is a leading cause of morbidity and mortality for hospitalized patients. The temporal trend of incidence of outcome of BSIs caused by different micro-organisms have not been systematically studied at the population level.

Methods

The Nationwide Inpatient Sample (NIS) database is the largest database of hospitalized patients in the US that includes 20% of hospitalized patients of multiple payer sources from 4,378 hospitals in the U.S. Patients with bacteremia or disseminated fungal infection were identified by ICD-9 codes for septicemia (038), septicemic (020.0), bacteremia (790.7), disseminated fungal infection (117.9), disseminated candida infection (112.5), or disseminated fungal endocarditis (112.81). Specific micro-organism infection was identified by a set of ICD-9-CM diagnoses codes for 21 types common pathogens. The incidence and mortality rate of BSI were calculated and presented as a population rate. Univariable methods were used for trend analysis and comparisons between groups. Logistic regression modeling was used to analyze outcome impact of different micro-organisms.

Results

A total of 13,996,374 adult patients with BSI were identified. The most common pathogens were Gram-positive bacteria (29.04%), followed by Gram-negative bacteria (24.82%), fungus (3.20%) and anaerobes (0.97%). The Gram negative BSI grew at rate faster than Gram positive BSI, with an annual increase of 10.42% and 4.37%, respectively. Anaerobic BSI grew at the fastest rate (annual increase 13.9%), while fungus infection grew at a relatively slow rate (annual increase 5.4%). The in-hospital mortality of Gram-negative, Gram-positive, and anaerobic BSIs declined significantly during the past decade, but the fungal infection did not (annual decrease -0.27%, p=0.51). Gram-negative BSI was associated with the lowest overall mortality rate (8.38%). Compared with Gram-negative BSI, the adjusted hazard ratios for 30-day mortality was 1.58(95% confidence interval [CI] 1.51-1.64) for Gram-positive BSI, 1.41 (95%CI 1.39-1.43) for anaerobic BSI, and 1.25 (95%CI 1.22-1.29) for fungal BSI.

Conclusion

By analyzing the microbiology codes for BSI in a nationwide database, we showed the incidence of microbiology documented BSI was increasing while the mortality was decreasing. Gram negative and anaerobic BSI were growing at an alarming rate. The changing landscape of microbiology in BSI may provide insights for future clinical and public health prevention.

000125 - Differential survival impact of obesity in patients with influenza or bacterial pneumonia

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Introduction

Obesity has been associated with increasing cardiovascular and metabolic comorbidity and mortality. Recent findings disclosed a reverse relationship between obesity and mortality in patients with heart failure, coronary heart disease, and chronic obstructive pulmonary disease. The phenomenon is known as the 'obesity survival paradox.' The paradox was revealed in the setting of potential patient selection bias initially. A more restricted cohort model was introduced in researching the obesity paradox. The effect of obesity on the outcome of viral or bacterial pneumonia has not been studied using the newly proposed analytical approach. We aim to investigate the association between different body mass index (BMI) and outcome of viral and bacterial pneumonia in a US-based nationwide database by using a restricted cohort approach.

Methods

We conducted a study using 2013-2014 data from Nationwide Readmissions Database (NRD) of United states. Patients who were admitted with the diagnosis of influenza or bacterial pneumonia were identified and included. The first stage analysis, we created a restricted cohort by excluding patients with any chronic illness, smoking, or alcoholism. In the second stage, we performed a three-way propensity score match among patients with three BMI categories (normal weight, obesity and morbid obesity). Obesity was defined as a BMI >= 30, and morbid obesity was defined as BMI >= 40. A Cox proportional hazard model, stratified by the PS-matched pairs was calculated to determine the risk of obesity on the pneumonia outcome.

Results

A total of 70,886,775 patients were registered in NRD during the study period. Of these 132,965 patients were admitted with the diagnosis of influenza, and 169,0760 patients were identified as bacterial pneumonia. We observed an opposite obesity-mortality relationship between influenza and bacterial pneumonia. Among patients with influenza, the mortality increased with BMI, while among patients with bacterial pneumonia, the mortality decreased with BMI. Morbid obesity was associated with decreased risk of mortality in patients with bacterial pneumonia (PS-matched HR 0.49, 95% CI: 0.25-0.96), while associated with increased risk of mortality in influenza (adjusted HR 1.64, 95%CI: 1.10-2.44). Similarly, obesity was associated with decreased risk of mortality in patients with bacterial pneumonia (PS-matched HR 0.41, 95% CI: 0.20-0.84), while associated with increased risk of mortality in influenza (adjusted HR 1.51, 95% CI: 1.01-2.26).

Conclusion

Obesity paradox has been thought by many as a result of biased statistical analysis. The major sources of bias were thought to be the sicker patients in the normal weight

comparison group and lower admission threshold for obese patients. In this work, we have, first time in literature, showed the differential survival impact of obesity on two different disease mechanism under the same analytical approach. This finding may provide a evidence against the obesity paradox as a biased analysis results but may have a solid biological base. Further clinical or basic studies focusing on the comparison of obesity effect in viral and bacterial infection may help clarify the biological mechanism of obesity paradox.

000142 - Lymphocyte kinetics during the early stage acts as a prognostic marker in patients with septic shock in intensive care unit

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Introduction

The lymphocytes play an important role in immune function during sepsis. Patients who die from sepsis often have consistent immunosuppression which manifested as lymphocyte apoptosis and exhaustion. However, previous study didn’t find any statistically significant relationship between the lymphocyte counts at ICU admission and mortality in sepsis. We hypothesized the lymphocyte kinetics could predict mortality in patients with septic shock

Objectives

To investigate if lymphocyte kinetics was associated with survival in critically ill patients with septic shock in intensive care unit (ICU).

Methods

This observational cohort study of septic shock patients was performed based on the record in our clinical database from January 1, 2014 to June 30, 2018. We extracted the demographic, clinical and laboratory data. Factors which may affect the outcome such as APACHE II, SOFA score, underlying disease were also collected. Neutrophil and lymphocyte results on the first and third day after ICU admission were extracted and neutrophil to lymphocyte ratios (NLR) were calculated. Our primary outcome was 28-day mortality. The Univariate and multivariate logistic regression models, cox proportional risk model, Kaplan-Meier model were used to analyze the association between the lymphocyte kinetics during first three days after ICU admission and the day-28 mortality.

Results

A total of 1245 patients with septic shock were included into analysis. There were 840 males and 405 females, with a mean age of 69.6 years. The Mean APACHE II and SOFA score were 23.3 and 9.8. The day-28 mortality was 34.94%. There were no significant difference of lymphocyte number (0.83±0.02 vs.0.80±0.04, p=0.552) and NLR(21.5±0.8 vs. 21.4±1.2,p=0.925) between survival and non-survivals at ICU admission. However, on the third day, the lymphocyte counts was significantly lower (0.95±0.03 vs.0.85±0.04,p-0.024) while NLR were significantly higher in non-survivors (15.3±0.6 vs.21.2±2.6,p=0.004). The delta lymphocyte counts was significant lower (0.16±0.03 vs. 0.03±0.04, p=0.008) while NLR was significant higher (-6.8±0.91 vs. 0.64±2.3, p<0.001) in non-survivors between the first and third day.Multivariate regression analysis showed that lymphocyte (OR 0.969 [95%CI, 0.947-0.991], p=0.008) counts and NLR (OR 1.011 [95%CI, 1.003-1.019], *p*=0.002) on the third day were associated with day-28 mortality in patients with septic shock. Cox regression analysis also showed that delta lymphocyte (OR 0.799 [95%CI, 0.646-0.989], p=0.039) and delta NLR (OR 1.011 [95%CI, 1.005-1.017], *p*=0.002) were significantly associated with 28-day mortality. In addition, Kaplan-Meier survival analysis revealed that and increasing in lymphocyte counts and decreasing NLR during the first three days after ICU admission were help to prolong survival time

Conclusion

The lymphocyte counts and NLR on the third other than first day were different between survival and non-survival septic shock patients. Lymphocyte kinetics during the first three days is a valuable prognostic marker in patients with septic shock in intensive care unit

000153 - Dynamic sST2 changes involved in coagulopathy and predicted bloodstream infections in elderly patients with dengue

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Introduction

Severe dengue virus (DENV) infection involves plasma leakage and vascular collapse and leads to significant morbidity and death. Serum soluble ST2 (sST2 [interleukin (IL)-1 receptor like-1 protein; IL-1-RL-1]) is high in pediatric cases of DENV infection, and the disease progresses. The serum sST2 levels associated with outcomes in the elderly with severe DENV infection, and with the mechanisms involved in coagulopathy and bloodstream infections, are unclear.

Methods

All DENV-infected patients who, between July 1 and December 31, 2015, provided a written informed consent for at least two blood sample analyses were enrolled. Serum levels of sST2 were quantified using ELISA kit. APACHE II and Sequential Organ Failure Assessment (SOFA) scores were calculated within the first 24 hours after admission. The onset day (day 0) of DENV infection was defined as the day of fever onset. The first sST2 test of residual blood samples was done when patient presented at an outpatient clinic or the ED. The second test was done after a patient was admitted to either the general ward or the ICU. All blood samples were analyzed after the DENV infection was confirmed. “ΔsST2” is defined as “changes of sST2 levels in serially paired samples”. Blood transfusions of fresh frozen plasma (FFP) or packed red cells were recorded during ED or/and ICUs stay. A bloodstream infection (BSI) was defined as any blood culture positive for relevant pathogens during admission. We excluded patients with only one blood culture positive for skin flora.

Results

Total 43 patients with DENV infection (severe dengue or dengue with warning signs) were enrolled after exclusion. The mean patient age was 75.0 ± 12.2 years and the case fatality rate was 44.2% (19/43). Significantly more non-survivors than survivors had positive ΔsST2s levels (78.9% vs. 12.5%, $p < 0.001$). When predicting DENV fatality, the area under the curve of the receiver operating characteristic for serum ΔsST2 levels was 0.857. Moreover, patients given FFP transfusions were significantly ($p = 0.025$) more likely to have higher serum ΔsST2 levels than were those who had not been given FFP transfusions. DENV patients with early BSIs had positive ΔsST2 levels.

Conclusion

Serum sST2 changes might indicate DENV infection severity in the elderly; sST2 might be important for modulating coagulopathy in severe DENV infections; and elevated sST2 might be associated with early bloodstream infections in patients with DENV infections.

000159 - Early Use the Third Generation Antibiotics in ED is Key Factor for Survivals in the Management of Septic Shock Patients—A Population Based Study in Taiwan

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Introduction

Since Rivers reported the early goal directed therapy (EGDT) in treating sepsis, the EGDT become a standard for the sepsis patients. But the treatment have been revised in the recent years, raising the question of which elements of the EGDT protocol are really necessary in treating sepsis patients.

Methods

Our data contains the original claim data of one million beneficiaries that enrolled in the National Health Insurance program from 2005 to 2009. All the septic shock patients were included by coding with sepsis (ICD-9-CM code:038.x) and using inotropic agents (DOPAMINE、LEVOPHED) in the emergency department.

The patients using central vein catherter (47015B), checking ABG (09041B), or lactate (09059B) and using the third generation antibiotics (by ATC code) were analyzed as the standard group, other patients were analyzed as the controlled group. All the other variables, including the age, genders, triage classifications, comorbidities, and the hospital levels were analysed in the regression model. SAS 9.13 were used for data analysis.

Results

There is no statistic significance difference in mortality bewteen the different hospital levels. And, there is no significance difference in mortality whether the patients received central vein cathreters in ER or not. But, there is significance difference in mortality if the patients accepted ABG (p=0.018), lactate (p=0.012) and the third generation antibiotics (p=0.002). In the logistic regression model, the septic shock patients who got standard treatments in ER had lower risk of mortality (OR=0.46, p=0.023) in medical centers. However, in regional hospitals, the septic shock patients who got standard treatments in ER had no influence for risk of mortality (OR=1.068, p=0.926).

Conclusion

In the septic shock patients, there is a significance difference in mortality if the patients accepted ABG, lactate, and the third generation antibiotics. And the septic shock patients who got the standard four treatments in ER had lower risk of mortality in medical centers.

000178 - Statins Improve the Long-term Prognosis in Patients Who Have Survived Sepsis: A Nationwide Cohort Study in Taiwan

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Introduction

Most patients diagnosed with sepsis die during their first episode, with the long-term survival rate upon post-sepsis discharge being low. Major adverse cardiovascular events and repeated infections were regarded as the major causes of death. No definite medications have proven to be effective in improving the long-term prognosis. We aimed to examine the benefits of statins on the long-term prognosis of patients who had survived sepsis.

Methods

Setting: Between 1999 and 2013, a total of 220,082 patients who had been hospitalized due to the first episode of sepsis were included, with 134,448 (61.09%) of them surviving to discharge. The surviving patients who were subsequently prescribed statins at a concentration of more than 30 cumulative Defined Daily Doses (cDDDs) during post-sepsis discharge were defined as the users of statin.

Participants: After a propensity score matching ratio of 1:5, a total of 7,356 and 36,780 surviving patients were retrieved for the study (statin-users) and comparison cohort (non-statin users), respectively. The main outcome was to determine the long-term survival rate during post discharge.

Interventions: HR with 95% CI was calculated using the Cox regression model to evaluate the effectiveness of statins, with further stratification analyses according to cDDDs.

Results

The users of statins had an adjusted HR of 0.29 (95% CI, 0.27-0.31) in their long-term mortality rate when compared with the comparison cohort. For the users of statins with cDDDs of 30–180, 180–365, and >365, the adjusted HRs were 0.32, 0.22, and 0.16, respectively, (95% CI, 0.30-0.34, 0.19-0.26, and 0.12-0.23, respectively), as compared with the non-statins users (defined as the use of statins <30 cDDDs during post-sepsis discharge), with the *P* for trend <.0001. In the sensitivity analysis, after excluding the surviving patients who had died within three to six months of post-sepsis discharge, the adjusted HR for the users of statins remained significant (0.35, 95% CI 0.32-0.37 and 0.42, 95% CI 0.39-0.45, respectively).

Conclusion

Statins may have the potential to decrease the long-term mortality of patients who had survived sepsis. However, more evidence, including clinical and laboratory data, is necessary in order to confirm this observation.

000192 - Epidemiological Correlation of Invasive Pulmonary Aspergillosis with Local Ambient Particular Matter (PM2.5 and PM10) but not with Influenza in Southern Taiwan, 2018

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Introduction

Invasive pulmonary aspergillosis (IPA) might comprise up to 23-29% of severe influenza patients. In Taiwan, epidemiological association of IPA with severe influenza (2015-2016) has been reported. Meanwhile, prior high-level ambient fine particulate matter (PM) with a diameter of 2.5 micrometres (PM2.5) before influenza epidemic was also noticed. Meanwhile, association of PM10 and ambient concentration of *Aspergillus* spores was documented before. However, detailed evidence of epidemiological linkage between PM (PM2.5 or PM10) and IPA has been limited.

Objectives

We compare the correlation of monthly occurrence of IPA cases with monthly average level of PM (PM2.5 and PM10) at different local areas as well as with the monthly numbers of influenza patients.

Methods

We retrospectively reviewed adult patients with influenza in 3 Chi Mei medical systems (1 medical center, 1 regional hospital, and 1 local hospital) in Tainan city from January 2018 through December 2018. Influenza was confirmed by PCR methods using primers specific for Flu A, Flu B, Flu A(H1N1) and Flu A(H3N2). The definition of probable IPA required abnormal radiological findings and positive serum *Aspergillus* galactomannan (GM) antigen. Platelia *Aspergillus* Ag EIA (Bio-Rad Laboratories, Marnes-La-Coquette, France) was used to detect GM in blood with a positive cut-off value of $\geq$ 0.5 index. PM (PM2.5 or PM10) as an index of ambient air pollution in Tainan city was obtained from Taiwan Air Quality Monitoring Network, in comparison to that of Taipei, Taichung and Kaohsiung cities. Spearman's correlation was used to measure the epidemiological association between two variables.

Results

A total of 119 patients with IPA were identified in Chi Mei medical systems in Tainan city in 2018. Monthly average PM2.5 and PM10 levels in Tainan and Kaohsiung cities, but not in Taipei city, were significantly correlated with the development of IPA in Tainan. The PM2.5 but not PM10 in Taichung city reached statistical significance in correlation analysis with IPA in Tainan. The monthly occurrence of IPA did not significantly correlate with influenza patients stayed in an intensive care unit (ICU) or all detected patients in the hospitals (Table).

IPA Cases	Influenza (all)		Influenza (ICU)		Taipei	Taichung	Tainan	Kaohsiung
	r	*p*	r	*p*	*p* for PM2.5			
N = 119	0.20	0.534	0.152	0.636	0.546	0.028	0.0005	0.0005
					p for PM10			
					0.298	0.086	0.011	0.0002

Conclusion

There are evidences of significantly epidemiological correlation of the development of IPA with local ambient PM (PM2.5 and PM10). IPA did not correlate with ambient PM in distant area and has no correlation with all detected influenza cases, including patients stayed in ICU.

000199 - Epidemiology and incidence of sepsis in a tertiary care hospital of Pakistan, a cross sectional study based on ICD 9 coding

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Introduction

Sepsis remains a leading cause of death in hospitalized patients throughout the world. 85% of the global burden of sepsis,is in low to middle income countries ,but , there are limited epidemiological studies from those countries (1,2,3,4)on the incidence and outcome of sepsis.

Objectives

A sound, detailed and careful analysis was therefore needed to estimate the true incidence of sepsis, risk factor for development, progression of disease and its outcome, in our country

Methods

An analysis was undertaken of retrospective data from electronic discharge records of all patients aged 17 or above ,admitted with sepsis in year 2013-2014,at Agha Khan university hospital which is a JCIA accredited, tertiary care hospital.A validated method requiring combination of two ICD-9 codes(international classification of diseases,ninth revision,clinical modification) representing infections and acute organ dysfunction ,based on Angus and Martin(5,6)methodology ,along with ICD-9codes for sepsis, severe sepsis and septic shock ,was used to abstract data

Results

An overall 8759 patients were identified to have sepsis or severe sepsis,out of total 31,111,admissions in year 2013-14. Out of these cases, 61.25% (5,365) had sepsis while 38.75% (3,394) had more severe form of disease that is severe sepsis or septic shock. Out of the total 8,759 patients, 58.10% (5,089) remained in the ward . 31.93% (2,797) utilized the Special Care Unit (SCU) while 9.97% (873) utilized the Intensive Care Unit (ICU).

The overall mortality with sepsis, in our study, was found to be 9.8% and mortality from more severe form of disease that is with septic shock to be around 22.8%.The most common comorbidities were Diabetes (22.8%), Renal Disease (14.7%) and COPD (14.7%).The most common organ dysfunctions were renal, respiratory and hematologic dysfunction. The highest odds of mortality among the specific organ dysfunctions was of hematologic dysfunction (OR 25.09) followed by respiratory dysfunction (OR 19.62) and cardiovascular dysfunction (OR 17.72).

Sepsis was commonly seen in the young age group of 33-49 years (33%) while severe sepsis was mostly observed in the elderly , more than 65 years of age (47%). More females were affected by sepsis (53%) while more males were affected by severe sepsis (53%). The mean length of hospital stay was shorter in the sepsis group; 3.7 days compared to 7.5 days,in svere sepsis and septic shock group . The Charlson's comorbidity score was higher in the severe sepsis group with more than 53% having a Charlson's score of 3 or more. In the sepsis group only 13% had a Charlson's score of 3 or more

The Kaplan-Meier's analysis for in-hospital survival showed a survival of 93% at day 30 for patients who had sepsis compared to 39.7% for patients who had severe sepsis at the same time.

Conclusion

This study is first, ICD -9 coding based study ,from our country on incidence and outcome of sepsis .It is signifying high burden of disease in our cour country along with high mortality from severe form of the disease .

000200 - Clinical characteristics, management, and outcomes of emphysematous pyelonephritis: a hospital-based observational study

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Introduction

Emphysematous pyelonephritis (EPN) is a gas-producing and necrotizing infection involving collecting systemi, renal parenchyma, and perirenal tissue. Diabetes

mellitus (DM) is the most common predisposing factor (>90% reported EPN cases are DM). Gram negative bacilli are the most common pathogens, including *Klebsiella pneumoniae* and *Escherichia coli*, especially in immunosuppressive patients.

Methods

Ethics statement:

An approval (# CE18102A) was obtained from the Institutional Review Board of Taichung Veterans General Hospital for this retrospective review of existing data.

Setting:

The diagnosis of EPN was by clinical symptoms, laboratory investigations, and classes of computed tomography (CT) according to the study of Huang et al. Patients <18 years of age or with an incomplete course of treatment were excluded.

Participants:

Between July 2007 and December 2017, 35 consecutive patients were enrolled.

Interventions:

All patients were hospitalized after serial survey and initial management, including fluid resuscitation, empiric antibiotics, percutaneous catheter drainage (PCD), open drainage, or nephrectomy. Demographic data of the electronic medical charts were collected for analysis.

Results

Of the 35 EPN patients enrolled (22 females and 13 males; mean age 63.1±10.9 years), 22 patients (62.9%) had left EPN, 12 (34.3%) had right EPN, and one (2.9%) had bilateral EPN determined on CT. Limited EPN was involved within the urinary tract in 13 patients (37.1%) and extensive EPN had distant involvement in 22 patients (62.9%). Fever or hypothermia in 74 patients (84.0%) and SIRS were noted in 26 patients (74.3%) upon initial presentation to the hospital, respectively. The microbiology of all EPN patients was documented via pus/tissue, urine, or blood cultures. Gram negative bacilli, including *Klebsiella pneumoniae* and *Escherichia coli*, were the most common pathogens, which were found in blood cultures in 27 patients, pus/tissue cultures in 26 and urine cultures in 31. Methicillin-resistant *Staphylococcus aureus* was found in blood cultures in 10 patients and pus cultures in 9 patients. Anaerobic blood cultures were positive in 7 patients and anaerobic pus cultures were positive in 13 patients. Only one pus culture was positive for tuberculosis. The average length of hospital stay was 29.0±17.3 days and the intra-hospital mortality rate was 20%.

Conclusion

In our study, medical management only or plus PCD is recommended for most cases (62.9%) of EPN with a mortality rate of 13.6%. Survival rate is 100% for seven EPN patients receiving early or delayed nephrectomy, particularly in extensive EPN. Medical management plus PCD and open drainage has a high mortality rate of 66.7% in extensive EPN.

000203 - Pioglitazone Use Is Associated with Improved Sepsis Outcome: A Nationwide Observational Cohort Study in Asian Population

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Introduction

Phase 1 safety and pharmacokinetic randomized clinical trial of pioglitazone use in sepsis patients had been in the execution. However, except the animal studies, there is limited information from large epidemiologic studis.

Methods

This study was conducted by using a unique nationwide database in Taiwan, which included 1.6 million of diabetic patients. From 1999 to 2013, a total of 155,313 type 2 diabetic patients, first admitted for sepsis, were enrolled. Propensity score matching was conducted to avoid selection bias between the pioglitazone user and nonusers. The primary outcomes were total and 28-day hospital mortality. Multi-variable logistic regression analyses were conducted to calculate the odds ratios (ORs) of pioglitazone use. Sensitivity analysis by adding potential confounding drugs was also conducted.

Results

A total of 9,310 sepsis pioglitazone users and matched 46,550 nonusers were retrieved as the study and comparison group, respectively, in a ratio of 1:5. Pioglitazone use was associated with an adjusted odds ratio (aOR) of 0.95 (0.89-1.01) for total hospital mortality and aOR of 0.98 (0.91-1.04) for 28-day hospital mortality. In the sensitivity analysis, the results of adjusted model remained unchanged no matter adding NSAID, statin or aspirin. In the Kaplan-Meier analysis

with log-rank test, the cumulative mortality rate during hospitalization did not differ significantly between the two groups.

Conclusion

In this nationwide cohort study, pioglitazone use did not demonstrate significant decrease in the hospital mortality of sepsis irrespective of the previous positive animal studies.

000207 - Volume–Mortality Relationships during Hospitalization in the Sepsis Patients. A Population Based Research in Taiwan

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Introduction

Volume–outcome associations have been demonstrated in some diseases like trauma and myocardiac infarction. However, the existing literature regarding such associations in sepsis is not definitive in Taiwan.

Objectives

To test the hypothesis that annual hospital severe sepsis case volume is associated with mortality during admissions with sepsis and septic shock in medical centers and regional hospitals.

Methods

Our data contains the original claim data of one million beneficiaries that enrolled in the National Health Insurance program from 2005 to 2009. All the septic shock patients were included by coding with sepsis (ICD-9-CM code:038.x) and using inotropic agents (DOPAMINE/LEVOPHED) in emergency departments. The annual hospital case numbers and the hospital levels were recognized in our data base. And all the other variables, including the age, genders, triage classifications, comorbidities, and the hospital levels were analyzed in the regression model. SAS 9.13 was used for data analysis.

Results

The average mortality rates in the septic shock patients was 29.5% in the regional hospitals, and 29.7% in medical centers (p=0.92). The average mortality rate in the lowest volume hospitals was 31.7%, 33.8% in the middle volume hospitals, and 22.7% in the highest volume hospitals. But, after controlling all the factors in the regression model, compared with the lowest volume hospitals (as reference), the odds ratio for mortality in the middle volume hospital was 1.01 (p=0.89), and the odds ratio for the highest volume hospital was 0.52 (p<0.01) (C stat=0.79). In the sub-group analysis, such mortality-volume relationship was shown in regional hospitals, but not in medical centers.

Conclusion

In the sepsis patients, there is a significance lower mortality rate if the patients were treated in the highest volume hospitals. But the mortality-volume relationship was only shown in regional hospitals, but not in medical centers. That means, we should send the sepsis patients to medical centers, or the highest volume regional hospitals.

000069 - Serial Evaluation of the SOFA score in patients with sepsis: a retrospective analysis of the MIMIC III database

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Introduction

The Sequential Organ Failure Assessment (SOFA) score has become a diagnostic tool of sepsis. Repeated measurement of the SOFA score was also reported to be useful for predicting outcomes of critically ill patients, but only a few SOFA-related indicators were assessed and it still remains unknown which SOFA-related indicator is best for predicting outcomes of sepsis patients.

Objectives

The aim of this study is to evaluate the prognostic predictive value of different SOFA-related indicators.

Methods

We performed a large retrospective study using a modifiable data mining technique applied to the publicly available Medical Information Mart for Intensive Care III (MIMIC III) database (v1.4). A total of 10305 patients with sepsis were identified using the Sepsis-3 criteria and then included in the final analysis. For each patient, SOFA score was calculated by hours after ICU admission, and the following SOFA-related indicators were also calculated: T0 (SOFA score on ICU admission), T24 (SOFA score at 24 hours after ICU admission), T48, T72, T96; Max(0-24) (the max SOFA score 24 hours after ICU admission), Max(0-48), Max(0-72), Max(0-96), Max(0-Total) (the max SOFA score during the whole ICU stay); Mean(0-24) (the average SOFA score 24 hours after ICU admission), Mean(0-48), Mean(0-72), Mean(0-96), Mean(0-Total) (the average SOFA score during the whole ICU stay); ∆(0-24) (differences of SOFA score between 0 hours and 24 hours after ICU admission), ∆(0-48), ∆(0-72), ∆(0-96), ∆(0-Total), ∆(24-48), ∆(24-72), ∆(72-96), ∆(24-Total). Hospital mortality was chosen as the primary study outcome, and multivariate logistic regression and ROC curve analyses were performed to assess the associations of each SOFA-related indicators with outcomes and to evaluate their prognostic predictive value.

Results

All the SOFA-related indicators were found to be significantly associated with hospital mortality after adjusted for age, admission type, ethnicity, and comorbidity index (Elixhauser SID30). The top five strongest associations were observed in Mean(0-Total) (OR 1.47, 95%CI 1.44-1.51), ∆(0-Total) (OR 1.38, 95%CI 1.35-1.41), Max(0-Total) (OR 1.23, 95%CI 1.21-1.25), ∆(24-Total) (OR 1.23, 95%CI 1.20-1.25), and T0 (OR 1.22, 95%CI 1.19-1.25). Results of ROC curve analyses showed that the SOFA-related indicators with the five highest AUC were Mean(0-Total) (AUC=0.7529, 95%CI 0.7377-0.7681), ∆(0-Total) (AUC=0.7393, 95%CI 0.7225-0.7560), Max(0-Total) (AUC=0.7079, 95%CI 0.6923-0.7235), T48 (AUC=0.6994, 95%CI 0.6826-0.7163), and T72 (AUC=0.6984, 95%CI 0.6799-0.7168).

Conclusion

The prognostic predictive value of different SOFA-related indicators varies. The average SOFA score during the whole ICU stay might be the best indicator for predicting hospital mortality for patients with sepsis.

000095 - Comparison of Long-Term Mortality in Patients afterfirst Acute Myocardial Infarction with or without Sepsis

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Introduction

Although the association between systemic infection and cardiovascular events has been identified, an uncertainty still exists in the incidence and prognosis of sepsis in acute myocardial infarction (AMI).

Objectives

The purpose of our research was to assess the impact of sepsis on survival after a first AMI.

Methods

This was a retrospective cohort study by analyzing the data from the Taiwan National Health Insurance Research Database between 2000 and 2012 for patients with a primary diagnosis of a first AMI. Among the 186,112 prospective patients, sepsis was diagnosed in 13,065 (7.0%) patients. Propensity score matching technique was used to match 13,065 patients with sepsis and AMI with similar baseline characteristics. The survival of patients with AMI and sepsis was comparedto those with AMI alone by using pair ttest. Cox proportional hazards regression models, including sepsis, percutaneous coronary intervention (PCI), and comorbidities, were performed to further evaluate the different influences on mortality risk of patients hospitalized for a first AMI.

Results

Overall, 12-year survival rate was lower in AMI patientswith sepsis compared to those without sepsis ($P < 0.001$; hazard ratio, 1.78; 95% confidence interval, 1.72-1.83). Nevertheless, age is the leading risk factor of mortality in patients with a first AMI. Management with percutaneous coronary intervention (PCI) improved survival, independent of age, gender, and sepsis status.

Conclusion

In conclusion, sepsis significantly increased the mortality risk of patients after a first AMI, next only to increasing age. PCI may improve the long-term survivalof patients in comparison to those managed conservatively.

000144 - MSCs subjected to cyclic mechanical stretch alter the damage of Endothelial cell induced by LPS

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Introduction

Cell-based engineering strategies for stem cells have yield to a great deal of positive results[1].Mechanical stimulation has been increasingly recognized to play an important role in the regulation of stem cells function, including the modification of growth, proliferation and differentiation[2].Researches that look into the effect imposed on the MSCs could offer great help to optimize the utilization of MSCs.

Objectives

We sought to determine the effects of mechanical stretch on MSCs and focused on the modulation of different mechanical stretch parameters on the function of MSCs.

Methods

Bone marrow MSCs were seeded onto Flexcell BioFlex Culture Plates coated with Collagen Type I, and stretched with tension system (Flexcell, FX-5000T, tension system). To demonstrate the alterations of stretched MSCs compared to the non-stretched MSCs, we measured the morphological and inflammatory reaction. Moreover, we employed the flow cytometry (FCM) to detect the surface marker (CD+34, CD+44, CD+45, CD+105) of MSCs to uncover whether the MSCs are differentiated into other type of cells. In addition, we analysed the repairment of MSCs on the injury of endothelial cells (ECs) induced by LPS.

Results

Cyclic mechanical stretch could significantly change the morphological appearance of MSCs in a time and magnitude manner.But the expression of cell surface markers did not change correspondently.

Conclusion

These data indicate that the stretch stimulation could change the function of the MSCs.

000201 - Implementation of impact tools to reduce catheter-associated urinary tract infections on HEGV

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Introduction

Safety tools for control catheter-associated urinary tract infections (CAUTI) is already common practice worldwide and its implementation in bundle format is associated with a considerable reduction of infections.

Objectives

The proposal was to implement and make the whole team aware of the importance of screening and active search for risk factors for CAUTI.

Methods

A prospective, non-randomized, observational study was conducted at the Intensive Care Center of Hospital Estadual Getúlio Vargas with 40 beds attending clinical and surgical patients during the period of 1 year, comparing with the results of 1 year before the implementation. The inclusion criteria were patients aged over 18 years, hospitalized in the ICU and with at least using 24 hours of urinary catheter.

Results

Along one year, 2359 patients were included, total of 16575 patients / day, and 738 (32.9%) used urinary catheter with 2804 use of this device / day. The comparative data of one year before and after the implementation of the daily bundle are respectively: density of CAUTI 2.18 and 2.02 (p 0,56), absolute value of infections 12 and 4 (p 0,001), use of catheter bladder 56.2% and 32,9% (p 0,005),months in the year without urinary tract infection 03 and 08 (p 0,001), general mortality rate 37% and 29% (p 0,01).

Conclusion

There was a significant reduction in the number of daily urinary catheter use after the bundle was started due to the daily requirement of the device permanence justification. This reduction led to a reduction in the denominator of the density calculation, although the absolute value reduced to 33.3%, the density of CAUTI remained unchanged. A highlight refers after the implementation of the bundle, 08 months (2/3 of the year) were free of CAUTI and inferring in a significant reduction of

mortality although it cannot be attributed in isolation to the blunde of prevention to CAUTI due to the fact that during this period two new bundles ere started: prevention of VPAS and bloodstream infection.

000068 - Analysis of the relationship between the initiation time of anti-pneumocystis therapy and the treatment outcomes in HIV-negative patients with Pneumocystis pneumonia presented hypoxic respiratory failure with new infiltration on chest radiograph

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Introduction

Pneumocystis pneumonia (PCP), the disease caused by *Pneumocystis jirovecii*, in Human immunodeficiency virus (HIV)-negative patients has been increased, as the numbers of patients undergoing transplantation, receiving immunosuppressive therapy and antitumor chemotherapy continue to increase. Trimethoprim/sulfamethoxazole remains the drug of choice for PCP and failure to initial treatment is well established prognostic factor. Although there are many reports about PCP, relationship between the initiation time of anti-*pneumocystis* therapy and outcome is unclear.

Objectives

This study investigated the relationship between the initiation time of anti-*pneumocystis* therapy and the treatment outcomes in HIV-negative patients with *pneumocystis* pneumonia presented hypoxic respiratory failure with new infiltration on chest radiograph.

Methods

We retrospectively reviewed 117 patients with PCP admitted to the medical intensive care units (ICU) for respiratory support between October 2005 and July 2018. Patients who had HIV infections (n=19) or who admitted via outpatient care or transfer-in (n=30) or initial chief complain unrelated to respiratory symptoms (n = 17) were excluded. The diagnosis of PCP was based on the clinical symptoms and new infiltration on chest radiograph, along with the morphological identification of the organism in bronchoalveolar lavage fluid or lung tissue.

Results

Of 51 patients, the median interval between Emergency room (ER) visit to the initiation time of anti-*pneumocystis* therapy was 58.0 (28.0-97.8) hours. ICU mortality and hospital mortality were assessed by grouping with the IQR interval hours between ER visit to initiation time of anti-*pneumocystis* therapy as group 1 (less than 28.0 hours), group 2 (from 28.0 hours to 58.0 hours), group 3 (from 58.0 hours to 97.8 hours), and group 4 (more than 97.8 hours). When stratified according to group, there were no correlation in ICU mortality and hospital mortality (50.0%, 41.7%, 50.0%, and 16.7% from group 1 to group 4 in ICU mortality, 50.0%, 50.0%, 46.2%, and 33.0% from group 1 to group 4 in hospital mortality). Compared to survivors, non-survivors were more likely to be older (48.0 (34.5-59.0) vs. 64.0 (50.5-69.0); p = 0.007), more required mechanical ventilation (19 (67.9%) vs. 23 (100%); p = 0.009), increased SAPS 3 score (43.0 (30.5-54.5) vs. 56.0 (46.5-58.0); p = 0.030), more Cytomegalovirus (CMV) identified from respiratory specimens (3 (10.7%) vs 10 (43.5%); p = 0.011), and more failure to initial antimicrobial treatment for PCP (6 (21.4%) vs. 16 (69.6%); p = 0.002). After adjusting for potential confounding factors with p-values less than 0.2 on univariate analysis or clinically relevant factors, age (adjusted OR 1.071, 95% CI 1.016-1.128, p = 0.011), CMV identified (adjusted OR 8.977, 95% CI 1.409-57.199, p = 0.020), and failure to initial treatment (adjusted OR 9.868, 95% CI 2.008-48.502, p = 0.005) were independently associated with increased mortality.

Conclusion

Our data suggest that there is no relationship between the initiation time of anti-*pneumocystis* therapy and the treatment outcomes in HIV-negative patients with PCP presented hypoxic respiratory failure.