研究成果の刊行に関する一覧表

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Respirology 20

ORIGINAL ARTICLE

Interstitial lung disease associated with gemcitabine: A Japanese retrospective cohort study

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ABSTRACT

Background and objective: **Interstitial lung disease (ILD) is a widely recognized adverse consequence of gemcitabine administration, but data on gemcitabine-associated ILD are limited. This study aimed to elucidate the incidence and risk factors for this adverse event.**

Methods: **Patients who underwent gemcitabine-based chemotherapy between July 2010 and March 2013 were retrospectively identified using a Japanese nationwide administrative database. ILD was defined according to the International Classification of Diseases and Related Health Problems 10th Revision, codes: J70.2–70.4, J84.1 and J84.9. The cumulative incidence and risk factors for ILD were evaluated using a competing risk analysis.**

Results: **In total, 25 924 patients who underwent gemcitabine-based chemotherapy were identified from 331 hospitals (primary cancer; pancreatic, urothelial, biliary tract, lung, ovarian and breast, in 9070, 5578, 4803, 4388, 1339 and746 patients, respectively). ILD was observed in 428 patients (1.7%), and the cumulative incidence was estimated at 1.1% (95% CI: 1.0–1.2%), 1.5% (95% CI: 1.4–1.7%) and 1.9% (95% CI: 1.7–2.1%) at 3, 6 and 12 months, respectively. In the multivariable regression model, age >80 years and lung cancer were the strongest predictors for ILD (subdistribution hazard ratio (SHR), 2.61; 95% CI: 1.69–4.02 and SHR, 2.81; 95% CI: 2.16–3.65, respectively). Other significant risk factors included heavy smoking, prior chemotherapy and advanced cancer stage.**

Conclusion: **This study successfully demonstrated the clinical course of gemcitabine-associated ILD. Clinical oncologists should stratify individual patients for risk of ILD based on identified risk factors and fully consider the indication for gemcitabine-based chemotherapy.**

SUMMARY AT A GLANCE

This population-based study presents the clinical course of gemcitabine-associated ILD. The crude incidence of this adverse event was 1.7%, and five identified risk factors (older age, heavy smoker, prior chemotherapy, advanced cancer stage and lung cancer) should be evaluated before gemcitabine administration.

Key words: adverse effect, drug therapy, gemcitabine, incidence, interstitial lung disease.

Abbreviations: CCI, Charlson Comorbidity Index; CI, confidence interval; DPC, Diagnosis Procedure Combination; ICD-10, the International Classification of Diseases and Related Health Problems 10th Revision; ILD, interstitial lung disease; IQR, interquartile range; SHR, subdistribution hazard ratio.

INTRODUCTION

Gemcitabine hydrochloride is a cytotoxic nucleoside analog with antitumour activity against a wide spectrum of solid neoplasms, including pancreatic, biliary tract and non-small cell lung cancer.[1–5] This chemotherapeutic agent is well tolerated, with myelosuppression being the primary dose-limiting toxicity. However, pulmonary toxicity is a recognized adverse event after administration of gemcitabine, which has significant morbidity and mortality.[6–9] The spectrum of severity of gemcitabine-associated pulmonary toxicity ranges from dyspnoea, which is generally mild and self-limiting with a duration of a few hours, to rare but potentially fatal pulmonary disorders such as acute respiratory distress syndrome.[6,8,10]

Severe pulmonary toxicity associated with gemcitabine typically presents as interstitial lung disease (ILD),[11,12] in which the parenchymal or alveolar regions are affected by inflammation and fibrosis.[7,13,14] The cumulative incidence of gemcitabine-associated ILD is reported to be

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Bleeding after endoscopic sphincterotomy or papillary balloon dilation among users of antithrombotic agents

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Background and study aims: Severe bleeding is a potentially lethal complication after endoscopic sphincterotomy (EST) and endoscopic papillary balloon dilation (EPBD) for choledocholithiasis. This study aimed to evaluate the impact of antiplatelet agents and anticoagulants on this complication.

Patients and methods: Patients who underwent EST and EPBD were identified in a Japanese nationwide administrative database covering 1090 hospitals. Adjusting for other potential risk factors, we evaluated the association between oral administration of antiplatelet agents and/or anticoagulants (continuation, discontinuation, and non-use) and clinically significant bleeding within 3 days of the procedure.

Results: In total, 61 002 patients were analyzed (EST, 54 493 patients; EPBD, 6509). The rate of severe bleeding was 0.8% in both groups, but EPBD was performed more frequently than EST in patients with chronic renal failure, liver cirrhosis, and in those receiving antiplatelet agents or anticoagulants. The impact of continuation/discontinuation of antiplatelet agents on severe bleeding was not statistically significant in the EST or EPBD groups. The use of anticoagulants was associated with a statistically significant increase in severe bleeding compared with non-use for EST (1.6% 27 of 1688 patients vs. 0.8% 429 of 52 805 patients; adjusted odds ratio [OR] 1.70; 95% confidence interval [CI] 1.10–2.63) and for EPBD (3.0% [8 of 263 patients] vs. 0.7% 46 of 6246 patients; adjusted OR 2.91; 95%CI 1.36–6.24).

Conclusions: EST and EPBD can be safely performed in patients receiving antiplatelet agents. Users of anticoagulants are at high risk of bleeding, and the periprocedural management of these should be further investigated.

Introduction

Endoscopic management of bile duct stones is recognized as an effective and less-invasive nonsurgical procedure [1]. Endoscopic sphincterotomy (EST) [2,3] or endoscopic papillary balloon dilation (EPBD) [4,5] are usually carried out to facilitate stone extraction. Although the safety and efficacy of EST and EPBD have been widely reported, bleeding associated with sphincteroplasty is an inevitable complication owing to the nature of the procedure [3,6,7]; despite intensive care, by means of transfusion and endoscopic, angiographic, or surgical intervention, severe bleeding is potentially lethal. Although the definitions of bleeding vary considerably in the literature, the rates of clinically significant bleeding associated with EST and EPBD have been reported to be 1%–5% [2, 3,7–10] and <1% [4,5,9–11], respectively.

Antiplatelet agents and anticoagulants are being increasingly used in the prevention of cardiovascular and cerebrovascular disease in developed countries because of their aging populations [12, 13].

Theoretically, EST and EPBD in patients receiving antiplatelet agents and/or anticoagulants can increase the risk of severe bleeding during and after the procedure. To date, several small retrospective studies have reported conflicting results on EST-related bleeding in patients receiving antiplatelet agents [3,7,14–17], and there are no available data on EST in patients receiving anticoagulants. EPBD is preferable in patients with coagulopathy, based on the recognition that this procedure is less susceptible to bleeding than EST [18]; however, this question has rarely been evaluated in patients receiving anticoagulants [19]. For these reasons, there has been no consensus on the management of anticoagulants in the periprocedural period of EST and EPBD [20,21].

We were therefore motivated to conduct a retrospective observational study to elucidate the impact of antiplatelet agents and anticoagulants on procedure-related bleeding. We did so using

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ORIGINAL ARTICLE

Effect of intravenous magnesium sulfate on mortality in patients with severe acute asthma

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ABSTRACT

Background and objective: **Intravenous magnesium sulfate is used as adjunctive therapy for severe asthma exacerbations. However, previous randomized controlled trials of the administration of intravenous magnesium sulfate for asthma exacerbations have shown mixed results, and no study has evaluated its effect on mortality in patients with life-threatening asthma. The objective of this study was to investigate the association between intravenous magnesium sulfate administration and mortality in patients with severe asthma.**

Methods: **Patients with severe asthma requiring intravenous corticosteroids and oxygenation were selected using the Japanese Diagnosis Procedure Combination inpatient database. One-to-one propensity score matching was performed between patients having received or not intravenous magnesium sulfate. Primary outcomes were 7-, 14- and 28-day mortalities. Secondary outcomes were total dose of intravenous corticosteroids during hospitalization, duration of mechanical ventilation and length of stay.**

Results: **Among 14 122 eligible patients, 619 received intravenous magnesium sulfate. Propensity score matching created a matched cohort of 599 pairs with and without intravenous magnesium sulfate. There were no significant differences between patients with and without intravenous magnesium sulfate in terms of 28-day mortality (1.3% vs 1.8%, $P = 0.488$), median total dose of intravenous corticosteroids (2400 mg vs 2400 mg, $P = 0.580$), median duration of mechanical ventilation (1 day vs 1 day, $P = 0.118$) and median length of stay (16 days vs 13 days, $P = 0.640$).**

Conclusion: **This study found no significant benefit of intravenous magnesium sulfate use in terms of mortality in patients with severe acute asthma.**

Key words: asthma exacerbation, intravenous magnesium sulfate, mortality, propensity score matching.

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SUMMARY AT A GLANCE

IV MgSO4 is used as adjunctive therapy for severe asthma exacerbations despite a lack of strict evidence on effect. This large, nationwide, retrospective study found no significant association between the use of IV MgSO4 and mortality in patients with severe acute asthma.

Abbreviations: ICD-10, International Classification of Diseases 10th Revision; IV MgSO4, intravenous magnesium sulfate.

INTRODUCTION

Asthma exacerbations are treated primarily with oxygen administration, inhaled short-acting β2-agonists and systemic corticosteroids,[1] with the addition of epinephrine according to asthma severity.[2] Intravenous magnesium sulfate (IV $MgSO_4$) has been regarded as an adjunctive therapy for severe and life-threatening asthma exacerbations.[1] However, the Global Strategy for Asthma and Management and Prevention 2014, which represents the global standard guidelines for asthma, did not recommend IV $MgSO_4$ for routine use in asthma exacerbations, but acknowledged that its use reduced hospital admissions in some patients.[3]

Previous randomized controlled trials have shown mixed results regarding the efficacy of IV $MgSO_4$ for asthma exacerbations. Some studies indicated that IV $MgSO_4$ had no significant effect on the proportion of patients requiring hospital admission,[4–9] breathlessness[5,10] or respiratory function,[4–8,10,11] while others suggested that it improved respiratory function[9,12,13] and hospital admission rates.[12,13] One randomized controlled study concluded that IV $MgSO_4$ only reduced hospital admissions in patients with severe asthma.[4] However, these studies only included patients with relatively less severe asthma who were able to undergo pulmonary function tests or report subjective symptoms. To the best of our knowledge, no study

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Differences in cancer stage, treatment and in-hospital mortality between patients with and without schizophrenia: retrospective matched-pair cohort study

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Background
Healthcare access and outcomes in cancer patients with schizophrenia remain unclear.

Aims
To investigate the likelihood of early diagnosis and treatment in patients with schizophrenia who have cancer and their prognosis.

Method
A retrospective matched-pair cohort of gastrointestinal cancer patients was identified using a national in-patient database in Japan. Multivariable ordinal/binary logistic regressions was modelled to compare cancer stage at admission, invasive treatments and 30-day in-hospital mortality between patients with schizophrenia ($n = 2495$) and those without psychiatric disorders ($n = 9980$).

Results
The case group had a higher proportion of stage IV cancer (33.9% *v.* 18.1%), a lower proportion of invasive treatment (56.5% *v.* 70.2%, odds ratio (OR) = 0.77, 95% CI 0.69–0.85) and higher in-hospital mortality (4.2% *v.* 1.8%, OR = 1.35, 95% CI 1.04–1.75).

Conclusions
Patients with schizophrenia who had gastrointestinal cancer had more advanced cancer, a lower likelihood of invasive treatment and higher in-hospital mortality than those without psychiatric disorders.

Declaration of interest
None.

Life expectancy of people with schizophrenia has been reported to be shorter than that of the general population[1–3] and the gap has increased.[4,5] Most excess deaths in the schizophrenia population have been reported to be as a result of chronic physical conditions, such as cardiovascular disease and cancer.[2,5–10] Studies indicated that the cancer incidence in patients with schizophrenia was no higher than in the general population.[11–17] However, cancer mortality in patients with schizophrenia was higher than in non-psychiatric patients.[10,18–21] The reason for the discrepancy between cancer incidence and mortality in patients with schizophrenia remains unclear;[20] however, potential related factors may include delayed diagnosis and lower likelihood of receiving cancer care. Several studies have found a difference in access to cancer care between patients with schizophrenia and the general population,[22] with those with schizophrenia being less likely to receive screening for cancer.[23–26] A few studies suggested that people with schizophrenia may have undergone delays in the diagnosis of cancer and initiation of treatment.[18,27,28] Also, some studies indicated that patients with schizophrenia were less likely to receive standard surgical and non-surgical treatment for cancer.[18,27,28] However, most studies have been limited owing to a lack of detailed patient background data, including cancer stage and comorbidity. The only study to include information about cancer staging measured the presence of metastases, which is rather crude compared with cancer stage.[18] Further, many studies have had small sample sizes and lacked control groups. Additionally, little is known about the difference in short-term mortality following treatment between patients with schizophrenia and non-psychiatric patients.[29] In the present study, we hypothesised that patients with schizophrenia were less likely to receive an early diagnosis of cancer, less likely to undergo invasive cancer treatments and more likely to have a poor prognosis. To test these hypotheses, we used a national in-patient database in Japan to conduct a matched-pair cohort study: we compared cancer stage on admission, receipt of surgical and endoscopic treatments and 30-day in-hospital mortality between gastrointestinal cancer patients with schizophrenia and those without psychiatric disorders.

Method

Data source

The Japanese Diagnosis Procedure Combination database is a national database of in-patients in Japan. Details of the database have been described elsewhere.[30,31] In brief, the database contains administrative claims and discharge abstract data including the following: unique hospital identifiers; postal codes of patient residential areas; patients' age and gender; diagnoses and comorbidities on admission coded according to ICD-10;[32] procedures; tumour, node, metastasis classification of malignant tumours and cancer stage; pack-year smoking status; and in-hospital death. As of 2012, the database included approximately 7 million in-patients from around 1000 hospitals, representing approximately 50% of all acute care in-patient admissions in Japan. Approval for this study was obtained from the Institutional Review Board at The University of Tokyo. Because of the anonymous nature of the data, the requirement for informed consent was waived.

Patient selection and data

We identified patients aged ⩾40 years who were admitted to the participating hospitals with a primary diagnosis of gastric cancer (ICD-10 code, C16) or colorectal cancer (C18–20) and were discharged between 1 July 2010 and 31 March 2013. We excluded

Clinical Investigations

Clinical Practice Patterns in Constrictive Pericarditis Patients With Heart Failure: A Retrospective Cohort Study Using a National Inpatient Database in Japan

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ABSTRACT

Background: Previous studies on constrictive pericarditis (CP) mainly concerned patients undergoing pericardiectomy. The reported perioperative mortality of CP patients remained high. Data on medically treated CP patients without pericardiectomy have been scarce.

Hypothesis: Constrictive pericarditis patients with more comorbidities are less likely to undergo pericardiectomy.

Methods: Using the Diagnosis Procedure Combination database from 2007 to 2013, we retrospectively identified CP patients admitted with heart failure of New York Heart Association (NYHA) class II to IV. We compared clinical characteristics between patients treated with and without pericardiectomy. A multivariable logistic regression analysis was performed to assess the factors associated with likelihood of undergoing pericardiectomy.

Results: Of 855 eligible patients, 164 (19.2%) underwent pericardiectomy (surgery group) and 691 (80.8%) did not (no-surgery group). The surgery group was younger (mean age, 65.0 years vs 70.3 years; $P < 0.001$) and more often male (81.7% vs 72.2%; $P = 0.013$) than the no-surgery group. No significant difference was seen in NYHA class and Barthel Index between the groups, whereas the surgery group had a lower Charlson Comorbidity Index (CCI). Older age, female sex, and higher CCI were significantly associated with a lower likelihood of undergoing pericardiectomy. In the surgery group, 30-day postoperative mortality was significantly higher in patients who underwent cardiopulmonary bypass than in those who did not (11.3% vs 2.9%; $P = 0.030$).

Conclusions: Patients' backgrounds were associated with the likelihood of undergoing pericardiectomy. Conservative medical therapy may be acceptable in CP patients with severe background and high preoperative need for cardiopulmonary bypass.

Introduction

Constrictive pericarditis (CP) is a rare but important cardiac disease characterized by loss of the normal elasticity of the pericardial sac after inflammation of the pericardium.[1–3] According to previous case series (n = 85–165), CP patients have several etiologic backgrounds: idiopathic or viral (33%–64%), post-cardiac surgery (11%–37%), post-radiation therapy (6%–19%), and post-tuberculosis (6%–42%).[4–9] Because CP patients typically have impaired filling of the ventricles and reduced ventricular function, heart failure (HF) is a major concern. The HF symptoms in CP patients are generally progressive, unless CP is surgically treated.[1,2,4,5,7,10]

Pericardiectomy is a definitive treatment to improve hemodynamics in CP patients with HF.[2,4,11–13] However, removal of the inflamed pericardium is still technically challenging and has significant perioperative mortality (5%–10%), despite advances in perioperative

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Original article

Clinical Features of Adult Patients Admitted to Pediatric Wards in Japan

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A B S T R A C T

Purpose: Pediatricians generally need to treat adult patients who require long-term care for pediatric diseases. However, little is known about the characteristics of adult patients in pediatric wards. Using a national inpatient database, the aim of this study was to determine the clinical details of adult patients admitted to pediatric wards in Japanese acute-care hospitals.
Methods: We extracted all inpatients aged ≥19 years who were admitted to pediatric departments in Japan from April 2012 to March 2013. We examined the patients' main diagnoses and the use of life-supporting home medical devices.
Results: Of 417,352 patients admitted to pediatric wards during the study period, we identified 4,729 (1.1%) adult patients. The major diagnoses of the adult patients were malignancy, congenital heart disease, epilepsy, and cerebral palsy. More than 35% of the patients with cerebral palsy had a tracheostomy tube, gastrostomy tube, home central venous alimentation, or home respirator. More than 20% of patients aged ≥40 years in pediatric wards had adult diseases, including ischemic heart diseases, cerebrovascular diseases, and adult malignancy.
Conclusions: Many adult patients in pediatric wards had adult diseases. It is essential to establish a disease-oriented support system for adults with chronic conditions that originated in their childhood.

IMPLICATIONS AND CONTRIBUTION

Our national inpatient database study showed that approximately 1% of patients in pediatric wards were adults. Their diagnoses included malignancy, congenital heart disease, epilepsy, and cerebral palsy. More than 20% of patients aged ≥40 years had adult diseases including ischemic heart diseases, cerebrovascular diseases, and adult malignancy.

Recent improvements in pediatric care have helped to save a considerable number of patients with previously fatal medical conditions; this has resulted in more children with special health care needs (CSHCN) [1,2]. CSHCN incorporates children with chromosomal anomalies, which include the following: Down syndrome; malignancy; inborn error of metabolism (IEM); congenital heart disease (CHD); immune deficiency; endocrine disorders, including diabetes; cerebral palsy; epilepsy; and other congenital anomalies requiring surgical treatment.

When these patients become adults, the question of who should take care of them can become an important issue [3]. Physicians for adults lack experience in treating pediatric conditions. Pediatricians do not necessarily have experience in treating adult conditions, such as ischemic heart disease, cerebrovascular diseases, Type 2 diabetes, and adult malignant tumors. Adult patients with chronic conditions that originated in childhood may hesitate to seek treatment at pediatric departments [4]. Many challenges remain to be solved in the transition of patients from pediatrician to adult physician care.

Several studies have examined the effect of transition programs from pediatricians to physicians for adolescent or young adult patients [5–8]. However, there are scant data on the demographics of such patients. It is important for pediatricians to understand the current status of adult patients in pediatric

Conflicts of Interest: The authors have no conflicts of interest to report.

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Outcomes after early or late timing of surgery for infective endocarditis with ischaemic stroke: a retrospective cohort study

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Abstract

OBJECTIVES: The timing of cardiac surgery for infective endocarditis with ischaemic stroke remains controversial.

METHODS: Using a nationwide inpatient database in Japan, we conducted a retrospective observational study. We identified patients aged 20 years or older with ischaemic stroke on admission who were diagnosed with infective endocarditis and underwent cardiac surgery during the initial hospitalization between July 2010 and March 2013. In-hospital mortality and perioperative complications were compared between the early (≤7 days) and late (>7 days) surgery groups using logistic regression analyses with adjustment for propensity scores and inverse probability of treatment weighting.

RESULTS: We identified 253 patients who underwent cardiac valve surgery for infective endocarditis with ischaemic stroke on admission. In-hospital mortality rates were 8.6 and 9.5% in the early (n = 105) and late (n = 148) surgery groups, respectively. There were no significant differences in the in-hospital mortality between the early and late surgery groups in the propensity score-adjusted model [odds ratio (OR), 0.95; 95% confidence interval (CI), 0.35–2.54] and inverse probability-weighted model (risk difference, −0.82%; 95% CI, −6.43 to 4.84%). The perioperative complication rates were 42.9 and 37.8% in the early and late surgery groups, respectively, and showed no significant differences in the propensity score-adjusted model (OR, 1.11; 95% CI, 0.63–1.97) and inverse probability-weighted model (risk difference, 1.54%; 95% CI, −7.13 to 10.2%).

CONCLUSIONS: Early timing of surgery for infective endocarditis patients with ischaemic stroke was not associated with higher in-hospital mortality or complications after admission. Early timing of surgery may not be contraindicated for infective endocarditis patients with ischaemic stroke.

Keywords: Endocarditis (all infectious agents) • Stroke • Surgery • Complications

INTRODUCTION

Neurological complications are some of the most common and serious complications associated with infective endocarditis (IE). Stroke is the most frequent complication, occurring in 10–40% of patients with IE [1–5], and is associated with poor outcomes [1, 2, 6–9].

Several studies have suggested that the risk of postoperative neurological complications related to cardiac surgery in patients with preoperative ischaemic stroke may be lower than previously assumed [10–12]. However, the timing of surgery for IE patients with ischaemic stroke remains controversial [7, 8, 10–16], and it is challenging for physicians to decide the optimal timing of such surgery.

Current guidelines provide inconsistent recommendations for the optimal timing of surgery for IE patients complicated with ischaemic stroke. The European Society of Cardiology guidelines [17] recommend that surgery for IE patients with ischaemic stroke should not be delayed unless contraindicated. The guidelines show that surgical indications include heart failure, uncontrolled infection, abscess or persistent high embolic risk, whereas delayed surgery is recommended for patients with intracranial haemorrhage, severe neurological damage or severe comorbidities. In particular, the guidelines show that surgery must be delayed for at least 1 month when intracranial haemorrhage exists. In contrast, the Society of Thoracic Surgeons guideline [18] recommends that surgery should be delayed for at least 2–4 weeks after most occurrences of ischaemic stroke, if possible. However, these recommendations were only based on limited studies with small cohort numbers and case series.

A recent study that evaluated the timing of surgery for IE patients with stroke indicated that delayed surgery was not significantly associated with better outcomes in terms of in-hospital mortality and 1-year mortality [19]. However, the study lacked preoperative information on stroke severity and did not assess perioperative complications.

Original Article

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Short-term outcomes following elective transcatheter arterial embolization for splenic artery aneurysms: data from a nationwide administrative database

Michio Naganuma[1], Hiroki Matsui[2], Jun Koizumi[3], Kiyohide Fushimi[4] and Hideo Yasunaga[2]

Abstract

Background: Splenic artery aneurysm (SAA) rupture is life-threatening. Although elective transcatheter arterial embolization (TAE) suggested low in-hospital death in previous studies, there has been no large multi-center study of elective TAE for SAA.

Purpose: To examine the short-term outcomes of TAE for splenic artery aneurysm (SAA) and analyze the factors associated with the outcomes, including liver cirrhosis, using a nationwide administrative inpatient database.

Material and Methods: We identified patients who received elective TAE with a principal diagnosis of SAA. We assessed the patient background characteristics, comprising age, sex, and specific co-morbidities, including liver cirrhosis. The outcomes included the rate of TAE-related complications (acute pancreatitis, splenic infarction, splenic abscess, or intraperitoneal hematoma), length of stay, and in-hospital mortality.

Results: Among 18.3 million inpatients in the database between July 2010 and March 2013, we identified 534 patients who received elective TAE for SAA at 229 participating hospitals. Fifty-four (10.1%) patients had liver cirrhosis. No in-hospital deaths were observed. Thirty-two (6.0%) patients had at least one TAE-related complication. A multivariate linear regression analysis revealed that liver cirrhosis was significantly associated with longer length of stay (9.5 days; 95% confidence interval [CI], 7.0–12.0 days; $P < 0.001$). A logistic regression analysis showed that liver cirrhosis was not significantly associated with TAE-related complications (odds ratio, 0.99; 95% CI, 0.29–3.39; $P = 0.980$).

Conclusion: The results revealed no in-hospital mortality and a low complication rate associated with elective TAE for SAA including liver cirrhosis patients.

Keywords

Splenic artery aneurysm, transcatheter arterial embolization, liver cirrhosis, in-hospital mortality, acute pancreatitis, splenic infarction

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Introduction

Splenic artery aneurysm (SAA) is a rare disease, but SAA rupture is life-threatening (1). Conventionally, surgical repair including aneurysm ligation with or without end-organ resection (i.e. splenectomy or distal pancreatectomy) has been performed for the treatment of SAA (1,2). Sclafani et al. reported transcatheter arterial embolization (TAE) for splenic injury more than three decades ago (3). Recently, transcatheter arterial embolization (TAE) for SAA has become widespread (1,4–8).

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BMC Musculoskeletal Disorders

RESEARCH ARTICLE Open Access

Perioperative stroke in patients undergoing elective spinal surgery: a retrospective analysis using the Japanese diagnosis procedure combination database

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Abstract

Background: Although a few studies on perioperative stroke following spinal surgery have been reported, differences in the incidence of perioperative stroke among various surgical procedures have not been determined. The purpose of this retrospective analysis was to investigate the incidence of perioperative stroke during hospitalization in patients undergoing elective spinal surgery, and to examine whether the incidence varied according to the surgical procedure.

Methods: A retrospective analysis of data from the Diagnosis Procedure Combination database, a nationwide administrative impatient database in Japan, identified 167,106 patients who underwent elective spinal surgery during 2007–2012. Patient information extracted included age, sex, preoperative comorbidity, administration of blood transfusion, length of hospitalization, and type of hospital. Clinical outcomes included perioperative stroke during hospitalization, and in-hospital death.

Results: The overall incidence of perioperative stroke was 0.22 % (371/167,106) during hospitalization. A logistic regression model fitted with a generalized estimating equation showed perioperative stroke was associated with advanced age, a history of cardiac disease, an academic institution, and resection of a spinal tumor. Patients who underwent resection of a spinal cord tumor (reference) had a higher risk of stroke compared with those undergoing discectomy (odds ratio (OR), 0.29; 95 % confidence interval (CI), 0.14–0.58; $p = 0.001$), decompression surgery (OR, 0.44; 95 % CI, 0.26–0.73; $p = 0.001$), or arthrodesis surgery (OR, 0.55; 95 % CI, 0.34–0.90); $p = 0.02$). Advanced age (≥80 years; OR, 5.66; 95 % CI, 3.10–10.34; $p \leq 0.001$), history of cardiac disease (OR, 1.58; 95 % CI, 1.10–2.26; $p = 0.01$), diabetes (OR, 1.73; 95 % CI, 1.36–2.20; $p \leq 0.001$), hypertension (OR, 1.53; 95 % CI, 1.18–1.98; $p = 0.001$), cervical spine surgery (OR, 1.44; 95 % CI, 1.09–1.90; $p = 0.01$), a teaching hospital (OR, 1.36; 95 % CI, 1.01–1.82; $p = 0.04$), and length of stay (OR, 1.008; 95 % CI, 1.005–1.010; $p \leq 0.001$) were also risk factors for perioperative stroke.

Conclusions: Perioperative stroke occurred in 0.22 % of patients undergoing spinal surgery. Resection of a spinal cord tumor was associated with increased risk of perioperative stroke as well as advanced age, comorbidities at admission, cervical spine surgery, surgery in a teaching hospital, and length of stay.

Keywords: Perioperative stroke, Database, Spinal cord tumor, Hemorrhagic stroke, Ischemic stroke

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NEUROSURGICAL FOCUS

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Does the microendoscopic technique reduce mortality and major complications in patients undergoing lumbar discectomy? A propensity score–matched analysis using a nationwide administrative database

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OBJECTIVE Although minimally invasive spinal surgery has recently gained popularity, few nationwide studies have compared the adverse events that occur during endoscopic versus open spinal surgery. The purpose of this study was to compare perioperative complications associated with microendoscopic discectomy (MED) and open discectomy for patients with lumbar disc herniation.

METHODS The authors retrospectively extracted from the Diagnosis Procedure Combination database, a national inpatient database in Japan, data for patients admitted between July 2010 and March 2013. Patients who underwent lumbar discectomy without fusion surgery were included in the analysis, and those with an urgent admission were excluded. The authors examined patient age, sex, Charlson Comorbidity Index, body mass index, smoking status, blood transfusion, duration of anesthesia, type of hospital, and hospital volume (number of patients undergoing discectomy at each hospital). One-to-one propensity score matching between the MED and open discectomy groups was performed to compare the proportions of in-hospital deaths, surgical site infections (SSIs), and major complications, including stroke, acute coronary events, pulmonary embolism, respiratory complications, urinary tract infection, and sepsis. The authors also compared the hospital length of stay between the 2 groups.

RESULTS A total of 26,612 patients were identified in the database. The mean age was 49.6 years (SD 17.7 years). Among all patients, 17,406 (65.4%) were male and 6422 (24.1%) underwent MED. A propensity score–matched analysis with 6040 pairs of patients showed significant decreases in the occurrence of major complications (0.8% vs 1.3%, $p = 0.01$) and SSI (0.1% vs 0.2%, $p = 0.02$) in patients treated with MED compared with those who underwent open discectomy. Overall, MED was associated with significantly lower risks of major complications (OR 0.62, 95% CI 0.43–0.89, $p = 0.01$) and SSI (OR 0.29, 95% CI 0.09–0.87, $p = 0.03$) than open discectomy. There was a significant difference in length of hospital stay (11 vs 15 days, $p < 0.001$) between the groups. There was no significant difference in in-hospital mortality between MED and open discectomy.

CONCLUSIONS The microendoscopic technique was associated with lower risks for SSI and major complications following discectomy in patients with lumbar disc herniation.

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KEY WORDS lumbar disc herniation; minimally invasive surgery; endoscopic surgery; mortality; complication; surgical site infection

ABBREVIATIONS BMI = body mass index; CCI = Charlson Comorbidity Index; DPC = Diagnosis Procedure Combination; ICD-10 = *International Classification of Diseases, 10th Revision*; MED = microendoscopic discectomy; SSI = surgical site infection.

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Effect of Hospital Volume on Outcomes of Surgery for Cleft Lip and Palate

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Purpose: Cleft lip and cleft palate are the most common craniofacial anomalies. However, the effect of hospital volume on outcomes of surgery for cleft lip and palate is unknown.

Materials and Methods: The Japanese Diagnosis Procedure Combination database was searched to identify patients who underwent surgery for cleft lip and palate from July 2010 through March 2013. Hospital volume was divided into tertiles (≤28, 29 to 82, and ≥83 admissions/yr). Outcomes included total cost, length of hospital stay, duration of anesthesia, and length of antibiotic use. The relation between hospital volume and surgical outcomes was analyzed by multivariable regression analyses.

Results: The authors identified 7,405 admissions for cleft lip alone, cleft palate alone, or cleft lip and palate during the study period. Compared with the reference low-volume hospital category, a shorter duration of anesthesia was seen in the medium-volume group (−15 minutes; 95% confidence interval, −37 to 7 minutes) and high-volume group (−22 minutes; 95% confidence interval, −65 to 3 minutes). No statistical associations were observed between hospital volume and total cost or length of stay. Although not statistically important, a higher hospital volume was associated with a shorter length of antibiotic use after adjusting for duration of anesthesia.

Conclusion: In the present study of surgical outcomes for cleft lip and palate, hospital volume was inversely associated with duration of anesthesia and length of antibiotic use, but was not statistically associated with length of hospital stay or total cost.

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Cleft lip and cleft palate are the most common congenital craniofacial anomalies. The reported occurrence of cleft lip and palate is 1 in 700 births worldwide and 1 in 500 births in Asians and Native Americans.[1] Cleft lip and palate affect facial appearance, psychiatric functions, and physical functions (speech, hearing, and feeding). Patients with cleft lip and palate require professional care from birth through early adulthood. Care for children with these defects generally spans several areas of medicine: nursing, plastic surgery, maxillofacial surgery, speech therapy, counseling, orthodontic treatment, and dental treatment.[2] In many countries, these treatments have tended to be fragmented and decentralized, leading to variations in the management of cleft care and a resultant lack of standardized care.

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Carperitide Increases the Need for Renal Replacement Therapy After Cardiovascular Surgery

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Alan K. Lefor, MD, MPH, PhD,‡ Kiyohide Fushimi, MD, PhD,§ and Masamitsu Sanui, MD, PhD†

Objectives: **Acute kidney injury is a common complication after aortic surgery. Carperitide, a human atrial natriuretic peptide, was reported to be effective for preventing acute kidney injury after cardiac surgery. However, most studies were from single centers, and results of meta-analyses are subject to publication bias. The aim of the present study was to investigate whether carperitide preserved renal function in patients undergoing cardiovascular surgery.**

Design: **Retrospective cohort study.**

Setting: **Participating hospitals (N = 281) in a national database from 2010 to 2013.**

Participants: **Adult patients (N = 47,032) who underwent cardiovascular surgery.**

Interventions: **None.**

Measurements and Main Results: **The main intervention variable investigated was the use of carperitide on the day of surgery. Assessed outcomes included receiving renal replacement therapy within 21 days of surgery and in-hospital mortality. Data were available for 47,032 patients, of whom 2,186 (4.6%) received carperitide on the day of surgery. Multivariate logistic regression analysis revealed that carperitide was significantly associated with a greater likelihood of receiving renal replacement therapy within 21 days of surgery, but not with in-hospital mortality.**

Conclusions: **In patients undergoing cardiovascular surgery, carperitide significantly increased the odds of receiving renal replacement therapy within 21 days after surgery.**

KEY WORDS: perioperative care, cardiovascular surgery, renal failure, carperitide, mortality, renal replacement therapy, atrial natriuetic peptide

ACUTE KIDNEY INJURY (AKI) is a common complication after cardiovascular surgery, affecting approximately 9% to 39% of patients.[1–3] AKI after cardiovascular surgery has been reported to be associated with longer hospital stay[4] and higher mortality.[5,6] The mortality rate of patients with AKI requiring renal replacement therapy (RRT) after cardiac surgery was reported to be 54%.[7] However, effective interventions to prevent postoperative AKI have not yet been established.[8]

Carperitide, a human atrial natriuretic peptide, was approved for use in patients with acute decompensated heart failure in 1995 in Japan. In 2000, the first randomized trial[9] demonstrated that carperitide preserved postoperative glomerular filtration rate. Several randomized trials[10–12] subsequently demonstrated that carperitide prevented AKI. Furthermore, meta-analyses showed that human atrial natriuretic peptide reduced the occurrence of AKI and the need for RRT after cardiac surgery.[13,14] As a result, this drug is used widely off-label in Japan with the aim of preventing AKI. However, most randomized trials are from single centers, and the results of meta-analyses are subject to publication bias.[13] Also, randomized controlled trials include only selected patients based on strict inclusion criteria and are not always representative of larger populations. No population-based studies have yet been reported. The aim of the present study was to investigate the impact of carperitide on outcomes in patients who underwent cardiovascular surgery, based on a retrospective analysis of data from the Diagnosis Procedure Combination database, which is a nationwide administrative database in Japan.

METHODS

The institutional review board of the University of Tokyo approved this study. Informed consent was waived because of the anonymous nature of the data.

Data Source

Inpatient data for this study were extracted from the Japanese Diagnosis Procedure Combination database.[15] The Diagnosis Procedure Combination is a case-mix inpatient classification system for acute care hospitals linked to health care reimbursement in Japan. More than 1,000 hospitals voluntarily participate in the Diagnosis Procedure Combination system. The database includes data from approximately 7 million inpatients, which represents approximately 50% of all discharges from acute care hospitals in Japan. The Diagnosis Procedure Combination database includes the following data: hospital identification number; patient gender and date of birth; dates of hospitalization and discharge; primary diagnosis, diagnosis precipitating admission, diagnosis consuming the most resources, pre-existing comorbidities at admission, and complications during hospitalization, which were coded with International Classification of Diseases, Tenth Revision codes and text in the Japanese language; procedures and the dates of procedures performed; dates and doses of drugs or blood products prescribed during the hospitalization; duration of anesthesia and cardiopulmonary bypass; and discharge status.

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Factors associated with prolonged duration of post-tympanoplasty local treatment in adult chronic otitis media patients: A retrospective observational study using a Japanese inpatient database

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ABSTRACT

Objective: The occurrence of persistent infection following tympanoplasty has been reported in many studies, and it is important to know the risks for site infection after tympanoplasty. In this study, we aimed to explore the factors affecting early wound complications after tympanoplasty for chronic otitis media.

Methods: We conducted a retrospective cohort study using the Diagnosis Procedure Combination database. Data on a total of 13,094 adult patients from 420 acute-care hospitals who received tympanoplasty for chronic otitis media from 2010 to 2013 were extracted. The duration (days) of postsurgical local wound treatment was measured as an outcome, because this duration was assumed to be prolonged by the existence of wound infection. The associations between treatment duration and background characteristics (age, sex, body mass index, smoking status, diabetes mellitus, use of antithrombotic agents, with or without cholesteatoma, duration of anesthesia, academic hospital or not, and hospital volume) were assessed by multivariable linear regression analyses, fitted with a generalized estimating equation to adjust for within-hospital clustering.

Results: The median treatment duration in each hospital was 8 days (interquartile range: 7–11). Factors significantly associated with longer treatment duration were: older age (0.2 days for 10-year increase), use of antithrombotic agents during hospitalization (1.8 days), and prolonged duration of anesthesia (vs. <120 min of anesthesia, additional 1, 2, 3, and 4 days for 120–179, 180–239, 240–299, and ≥300 min of anesthesia, respectively). Body mass index and smoking status were not significantly associated with treatment duration.

Conclusions: Older age, antithrombotic agents during hospitalization, and longer anesthesia time were independently associated with early local wound complications after tympanoplasty for chronic otitis media.

1. Introduction

Tympanoplasty (TP) is a safe and common procedure for chronic otitis media (COM) with or without cholesteatoma to remove inflammatory lesions of the middle ear, reconstruct the ossicular chain for improvement of hearing function, and repair perforations of the tympanic membrane [1,2].

A postauricular incision is usually made to harvest an autologous cartilage–perichondrium graft or temporal fascia graft. Early postsurgical local complications, such as wound infection, otorrhea from the outer ear canal caused by infection of the middle ear or mastoid, and graft failure, are troublesome, because they can cause excess healthcare resource utilization for postsurgical local treatment, as well as patient discomfort and inconvenience [3].

Numerous studies assessing the occurrence of persistent infection following TP have produced inconsistent findings, arising

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RESEARCH Open Access

Low-dose corticosteroid treatment and mortality in refractory abdominal septic shock after emergency laparotomy

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Abstract

Background: The role of low-dose corticosteroid as an adjunctive treatment for abdominal septic shock remains controversial.

Methods: We identified refractory septic shock patients who required noradrenaline and at least one of other vasopressor/inotropic (dopamine, dobutamine or vasopressin) following emergency open laparotomy for perforation of the lower intestinal tract between July 2010 and March 2013 using the Japanese Diagnosis Procedure Combination inpatient database. In-hospital mortality was compared between the low-dose corticosteroid and control groups.

Results: There were 2164 eligible patients (155 in the corticosteroid group, 2009 in the control group). We observed no significant difference between the groups in terms of in-hospital mortality in the unadjusted analysis [corticosteroid vs. control groups, 19.4 and 25.1 %, respectively; difference, −5.7 %; 95 % confidence interval (CI), −12.8 to 1.3]; however, a significant difference in in-hospital mortality was evident in the propensity score-weighted analysis (17.6 and 25.0 %, respectively; difference, −7.4 %; 95 % CI −9.9 to −5.0). An instrumental variable analysis with the hospital low-dose corticosteroid prescription proportion showed that receipt of low-dose corticosteroid was significantly associated with reduction in in-hospital mortality (differences, −13.5 %; 95 % CI −24.6 to −2.3).

Conclusions: Low-dose corticosteroid administration may be associated with reduced in-hospital mortality in patients with refractory septic shock following emergency laparotomy for lower intestinal perforation.

Keywords: Outcomes assessment, Peritonitis, Pneumonia, Sepsis, Steroid

Background

Despite recent developments in the diagnosis and treatment of sepsis, mortality in septic shock patients remains unacceptably high [1–3]. Corticosteroids offer potential as inhibitors of inflammation and in treating adrenal insufficiency and shock reversal; the use of corticosteroids may be useful as an additional therapy for septic shock [1, 4, 5]. The effectiveness of corticosteroids has been repeatedly evaluated using one of the gold standard experimental models for evaluating sepsis, cecal ligation and puncture models [6–9]. However, in clinical practice, there has been long-standing debate about the benefits of low-dose corticosteroid use in sepsis patients, and no consensus has been reached.

Recent landmark trials and meta-analyses of randomized controlled trials have produced conflicting results about the association between low-dose corticosteroid treatment and patient mortality in sepsis [3, 5, 10–20]. However, some meta-analyses have suggested that corticosteroid therapy may more likely benefit patients with severe septic shock that are vasopressor dependent [12, 15, 19]. Thus, the Surviving Sepsis Campaign guidelines recommend considering the use of low-dose corticosteroids for patients with septic shock who have responded poorly to fluid resuscitation and vasopressor agents [1].

A recent multicenter large database study has suggested that the early administration of low-dose

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Clinical Infectious Diseases

MAJOR ARTICLE

Prophylactic Antibiotics May Improve Outcome in Patients With Severe Burns Requiring Mechanical Ventilation: Propensity Score Analysis of a Japanese Nationwide Database

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(See the Editorial Commentary by Hankovszky et al on pages 67–8.)

Background. The use of prophylactic antibiotics for severe burns in general settings remains controversial and is not suggested by recent guidelines owing to lack of evidence for efficacy. We examined the hypothesis that prophylactic systemic antibiotic therapy may reduce mortality in patients with severe burns.

Methods. We identified 2893 severe burns patients (burn index ≥10) treated at 583 hospitals between July 2010 and March 2013 using the Japanese diagnosis procedure combination inpatient database. We categorized the patients according to whether they received mechanical ventilation within 2 days after admission (n = 692) or not (n = 2201). We further divided the patients into those with and without prophylactic antibiotics and generated 232 and 526 propensity score–matched pairs, respectively. We evaluated 28-day all-cause in-hospital mortality.

Results. Among the mechanically ventilated patients, significant differences in 28-day in-hospital mortality existed between control and prophylaxis groups in both unmatched (control vs prophylaxis; 48.6% vs 38.3%; difference, 10.2%; 95% confidence interval [95% CI], 2.7 to 17.7) and propensity score–matched groups (47.0% vs 36.6%; difference, 10.3%; 95% CI, 1.4 to 19.3). Among patients without mechanical ventilation, there was no significant difference in 28-day in-hospital mortality between the 2 groups in both the unmatched (control vs prophylaxis; 7.0% vs 5.8%; difference, 1.2%; 95% CI, −1.2 to 3.5) and propensity-matched groups (5.1% vs 4.2%; difference, 0.9%; 95% CI, −1.6 to 3.5).

Conclusions. Prophylactic antibiotics use may result in improved 28-day in-hospital mortality in mechanically ventilated patients with severe burns but not in those who do not receive mechanical ventilation.

Keywords. antibiotics; burns; pneumonia; prognosis; sepsis.

Globally, the incidence of burns severe enough to require medical attention was nearly 11 million people (ranked fourth of all injuries), and more than 300 000 persons die each year worldwide because of burn injuries in 2004 [1, 2]. Patients with severe burns are at high risk of developing invasive burn wound infections and sepsis, which often lead to multiorgan dysfunction and death [3]. Although burn wound surfaces are sterile immediately following thermal injury, they eventually become colonized by microorganisms. Gram-positive bacteria that survive the thermal insult, such as staphylococci located deep within sweat glands and hair follicles, colonize the wound surface within the first 48 hours [4, 5]. Several studies have suggested that severe thermal injuries damage the skin barrier; concomitantly, they depress local and systemic host cellular and humoral immune responses, inducing a state of immunosuppression that predisposes burn patients to infectious complications [6–8].

The prophylactic use of antibiotics for patients with severe burns in general settings (ie, not perioperative settings) has been examined in several single-center studies with limited numbers of patients [9–14]. However, no robust conclusions have emerged. Two recent studies of systematic reviews and metaanalyses of trials have produced conflicting results [15, 16]. Avni et al [15] suggested that prophylaxis with systemic antibiotics significantly reduced all-cause mortality by almost 50%; however, Barajas-Nava et al [16] found no statistically significant difference in all-cause mortality. In both studies it was declared that the methodological quality of the data was too weak to draw a firm conclusion [15, 16]. Thus, the role of

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Changes in Therapeutic Hypothermia and Coronary Intervention Provision and In-Hospital Mortality of Patients With Out-of-Hospital Cardiac Arrest: A Nationwide Database Study*

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Objectives: To evaluate the change in provision of therapeutic hypothermia and coronary intervention (postresuscitation care) over time and to clarify the association between these provisions and in-hospital mortality in patients with out-of-hospital cardiac arrest.

Design: A nationwide retrospective cohort study using multiple propensity score analyses.

Setting: Japanese Diagnosis Procedure Combination inpatient database.

Patients: Adult patients with cardiogenic out-of-hospital cardiac arrest related to ventricular fibrillation were identified from July to December in 2008–2012 (385 hospitals; $n = 3,413$).

Measurements and Main Results: We evaluated the proportion of patients receiving postresuscitation care and all-cause mortality at 30 days after out-of-hospital cardiac arrest. The proportion of postresuscitation care provision increased significantly over the study period (Mantel-Haenszel trend test, $p < 0.001$). The overall 30-day mortality was 52.0% (1,774/3,413), and the crude 30-day mortality decreased significantly during the study period ($p = 0.006$). Logistic regression analysis showed significant associations between the fiscal years 2011 and 2012 and 30-day mortality (2011: odds ratio, 0.75; 95% CI, 0.57–0.98 and 2012: odds ratio, 0.61; 95% CI, 0.47–0.81). Multiple propensity score analysis incorporating postresuscitation care showed that 30-day mortality was significantly associated with postresuscitation care, and the significant associations between 30-day mortality and the years 2011 and 2012 were no longer observed (2011: odds ratio, 1.05; 95% CI, 0.82–1.3 and 2012: odds ratio, 0.95; 95% CI, 0.74–1.2).

Conclusions: The 30-day survival rate of adult patients with cardiogenic out-of-hospital cardiac arrest related to ventricular fibrillation improved significantly after 2010 in Japan. This improvement may be associated with an increase in postresuscitation care provision. (*Crit Care Med* 2016; 44:488–495)

Key Words: cardiopulmonary resuscitation; heart arrest; hypothermia; survival

*See also p. 636.

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Out-of-hospital cardiac arrest (OHCA) affects approximately 300,000 people in the United States (1), 280,000 in Europe (2), and 100,000 in Japan (3) each year. Previous studies reported that the survival rate of OHCA patients had remained low and unchanged until the early 2000s (4). The "chain of survival" concept was developed to overcome this low survival rate and was incorporated into the International Liaison Committee on Resuscitation (ILCOR) and American Heart Association (AHA) guidelines in the 1990s. Recommendations included 1) early access to emergency medical care, 2) early cardiopulmonary resuscitation, 3) early defibrillation, and 4) early advanced cardiac life support. This concept continued to be used until publication of the 2010 guidelines (5, 6). However, the latest AHA guidelines, published in 2010, introduced a fifth link into the chain, namely postcardiac arrest care, in addition to the four existing links (7). The two main

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Validation of the prognostic burn index: A nationwide retrospective study

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ABSTRACT

Background: The burn index (BI = full thickness total burn surface area [TBSA] + 1/2 partial thickness TBSA) and prognostic burn index (PBI = BI + age) are clinically used particularly in Japan. However, few studies evaluated the validation of PBI with large sample size. We retrospectively investigated the relationships between PBI and mortality among burn patients using data from a nationwide database.

Methods: Data of all burn patients with burn index ≥1 were extracted from the Japanese Diagnosis Procedure Combination (DPC) inpatient database from 1 July 2010 to 31 March 2013 (17,185 patients in 1044 hospitals). The primary endpoint was all-cause in-hospital mortality.

Results: Overall in-hospital mortality was 5.9% (1011/17,185). Mortality increased significantly as the PBI increased (Mantel-Haenszel trend test, $P < 0.001$). The area under the receiver operating characteristic curve for PBI was 0.90 (95%CI, 0.90–0.91), and a PBI above a threshold of 85 showed the highest association with in-hospital mortality. Logistic regression analysis showed that PBI ≥ 85 (odds ratio (OR), 14.6; 95%CI, 12.1–17.6), inhalation injury with mechanical ventilation (OR, 13.0; 95%CI, 10.8–15.7), Charlson Comorbidity Index ≥ 2 (OR, 1.8; 95%CI, 1.5–2.3), and male gender (OR, 1.5; 95%CI, 1.3–1.8) were significant independent risk factors for death.

Conclusions: Our study suggested that a PBI above a threshold of 85 was significantly associated with mortality. The PBI and mechanical ventilation were the most significant factors predicting in-hospital mortality, after adjustment for inhalation injury, comorbidity, and gender.

1. Introduction

Determination of the factors which contribute to mortality has been an integral part of burns research. Several prognostic nomograms based on age and percentage area burned (total burn surface area, TBSA) were described more than half a century ago [1,2]. Baux [2] first described a prognostic score as follows: mortality rate = age + TBSA. The Baux score [2] gained wide international acceptance and was regarded as a landmark scoring system in the burn research field.

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