預測冠狀動脈繞道手術之預後結果及醫療費用

The Prediction Model for Outcome and Medical Costs after Coronary Artery Bypass Graft Surgery

中文摘要

本篇論文之目的為以病患手術前危險因子，應用 EuroScore 風險比分系統預測分析不停跳冠狀動脈繞道手術(Beating heart coronary artery bypass Graft)之直接醫療費用與預後結果(包括死亡、腎臟衰竭、胸部傷口感染、呼吸器使用時間大於 48 小時)。

方法：此以回溯性研究藉由病歷審查收集 2001 年 11 月至 2003 年 6 月期間共 378 位施行不停跳冠狀動脈繞道手術之病人為研究樣本，利用病人手術前的臨床資料(如性別、年齡、血液檢查、心臟超音波與心導管檢查等報告)，並以 Euroscore 風險比分系統計算風險分數用於預測醫療費用和預後結果。最後，在預測術後併發症發生機率的部分，以 ROC 曲線(Receiver Operating Characteristic)及 ROC 分析法對於此邏輯斯迴歸預測模型之鑑別能力作分析。

結果：378 位施行不停跳冠狀動脈繞道手術的病人 378 位施行不停跳冠狀動脈繞道手術病患 EuroScore 分數平均是 7 ± 4；總住院日數平均為 18 ± 10；EuroScore 與住院日數呈正相關；EuroScore 風險比分愈高則醫療費用越高，EuroScore 與總醫療費用之線性回歸，其預估值為 log (總醫療成本) = 12.288+0.0438 (EuroScore)，R2=31.50%(P<0.001)，即是 EuroScore 每增加一分則總醫療費用增加 0.3%。EuroScore 預測手術死亡之 ROC 曲線其 Approximate area under curve (AUC)=0.918；預測手術後腎臟衰竭之 ROC 曲線其 Approximate area under curve(AUC)=0.839，預測手術後胸部傷口感染之 ROC 曲線其 Approximate area under curve(AUC) = 0.546；而預測手術後呼吸器使用超過 48 小時的 ROC 曲線其 Approximate area under curve (AUC)=0.851。

結論：EuroScore 風險評估系統雖其設計是用來預測傳統冠狀動脈繞道手術之死亡率，研究發現 EuroScore 也可適用於不停跳冠狀動脈繞道手術，EuroScore 風險評估系統對於不停跳冠狀動脈繞道手術後預後結果與醫療費用之預測在統計上具顯著意義。未來應以更龐大且更完整的各式心臟手術臨床資料庫加以分析探討，發展本土的風險評估系統以便能更精準地預測心臟手術之預後結果與醫療成本。

英文摘要

Objective：In the last two decades evolutions of case-mix in heart surgery from mortality risk to complication risk has been observed in many centers. In spite of the increase in survival rate, an increase of the incidence of postoperative complications led to longer stay and more cost in medical issue. The aim of this study is apply additive EuroScore risk stratification model predict direct medical costs and clinical outcomes.

Methods: 378 consecutive beating heart coronary artery bypass graft surgery between November 2001 and June 2003 were enrolled with the addictive EuroScore risk model. The multivariance analysis was used to find independently associated with total direct costs predictive accuracy for in hospital outcomes was assessed by comparing the observed and the expected outcomes by EuroScore risk, the discriminatory power was evaluated by calculating the area under receiver operating characteristics (ROC) curve.

Result: The crude in hospital mortality was 4.76% , average EuroScore was 7 ± 4. The mean total length of stay was 18 ± 10. According to EuroScore 61 patients (16.14%) were at low risk, 126 (33.3%) at medium , and 191 (50.53%) at high risk costs were significantly and correlation with length of stay R2= 0.59 ($P < 0.001$); and costs were also significantly and correlation with EuroScore risk with R2= 0.32% ($P < 0.001$) and an increase of each single EuroScore risk score then the total direct costs increases 0.3% . EuroScore predict post-operation mortality Receiver Operating Characteristic (ROC) of approximate area under curve (AUC)= 0.918; predict post-operative renal failure approximate area under curve (AUC)= 0.839; predict post-operative sternal wound infection Approximate area under curve (AUC) = 0.546; predict post-operative ventilator use over 48 hours Approximate area under curve (AUC)= 0.851。

Conclusions: In this study, we can demonstrate EuroScore can be applied in beating heart coronary bypass as well as the conventional coronary artery bypass. The EuroSocre risk algorithm had a statistics significantly power to predict beating heart coronary artery bypass direct costs and clinical outcomes.