

Pulsed-field gel electrophoresis analysis, toxin types and plasmid profile for Methicillin resistant *Staphylococcus aureus*

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ABSTRACT

ABSTRACT Methicillin-resistant *Staphylococcus aureus* (MRSA) is one of the major pathogens infected in community hospitals, and the incidence of MRSA strains is increasing and becomes a common problem among the hospitals in Taiwan recently. In this study, the polymer chain reaction (PCR) was used to detect the *mecA* resistant gene, and the *Sma* I restriction enzyme was used to digest the chromosomal DNA of MRSA. In addition, the plasmid profile and the pulsed field gel electrophoresis (PFGE) analysis were used to investigate the distribution of the toxin types for MRSA strains from Veterinary General Hospital (VGH) in Taichung and Center for Disease Control, Taiwan, ROC. (TCDC), and trace the MRSA infection in the hospitals. The PCR results showed that 45 (59.21 %) clinical strains from VGH and 23 (16.3 %) human *S. aureus* strains from food-poisoning cases provided by TCDC possessed *mecA* resistant gene. The ratio of MRSA strains from hospitals was higher than that from food-poisoning cases. As for the distribution for enterotoxin types, it was found that the major enterotoxin types for the strains from hospitals and food-poisoning cases were the enterotoxin A and B, respectively. From the results of the plasmid profiles for MRSA strains, totally 29 distinct plasmid types were found. Of them, no co-shared types were found in the isolates from hospitals and food-poisoning cases. The PFGE results showed that 18 PFGE types were found in the 68 MRSA strains from hospitals and food-poisoning cases in 2003, and the major types for the strains from hospitals were different from those for the strains from food-poisoning cases. In addition, the clinical strains isolated between 1998 and 2003 were found high similarity in PFGE type. The results of this study reveal that the MRSA with same PFGE type still prevail in hospitals.

Keywords : Methicillin-resistant *Staphylococcus aureus*, Pulsed-field gel electrophoresis, Enterotoxin types, Plasmid profiles.

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系統編號: 093DYU00111004 出版年: 94 研究生: 賴潔賢 研究生(英文姓名): Chieh-hsien Lai 論文名稱: 台灣地區1998-2003年間食品中毒案例及臨床樣本分離之Methicillin抗藥性金黃色葡萄球菌菌株脈衝式膠體電泳、毒素型分佈及質體圖譜之分析
英文論文名稱: Pulsed-field gel electrophoresis analysis, toxin types and plasmid profile for Methicillin resistant *Staphylococcus aureus* strains isolated in Taiwan from food-poisoning cases and clinical samples between 1998-2003 指導教授: 張基郁; 曾浩洋 指導教授(英文姓名): Chi-Yue Chang; Hau-Yang Tsen 學位類別: 碩士 校院名稱: 大葉大學 系所名稱: 生物產業科技學系 學號: R9214010 學年度: 93 語文別: 中文 論文頁數: 91 關鍵詞: methicillin抗藥性金黃色葡萄球菌、脈衝式膠體電泳、毒素型分佈、質體圖譜 英文關鍵詞: Methicillin-resistant *Staphylococcus aureus*, Pulsed-field gel electrophoresis, Enterotoxin types, Plasmid profiles. 被引用次數: 0 [摘要] 中文摘要 Methicillin抗藥性金黃色葡萄球菌(Methicillin-resistant *Staphylococcus aureus*, MRSA) 為造成院內感染之主要病原菌之一，所導致之各種感染有逐漸增加之趨勢，為國內各醫院之共同問題。本研究利用聚合酶鏈鎖反應檢測*mec A*抗性基因以及利用*Sma* I 限制酶剪切MRSA菌株染色體DNA並配合脈衝式膠體電泳分析、質體圖譜分析方法及毒素型分佈探討不同來源及不同時間MRSA菌株之相關性，以瞭解菌株移轉情形及醫院內的感染情形。本研究所收集之226株金黃色葡萄球菌分別來自台中榮民總醫院以及行政院衛生署疾病管制局中部檢驗站之食品中毒案例人體分離檢體。研究結果顯示，以PCR方法檢測醫院來源之臨床金黃色葡萄球菌菌株，有45株菌帶有*mecA*抗性基因(59.21%)，而在食品中毒案例人體分離之菌株中則有25株菌(16.67%)帶有*mec A*抗性基因，結果顯示，醫院來源之金黃色葡萄球菌有較高的MRSA分離比例；在毒素型分佈方面，醫院臨床菌株所帶之腸毒素類以A型腸毒素為主；而食品中毒案例人體分離菌株則以帶有B型腸毒素居多。在質體圖譜分析方面可將MRSA分為29種質體圖譜類型，醫院臨床與食品中毒案例來源之間沒有完全相同的質體圖譜，因此可配合其他分型方法如PFGE等用以調查MRSA菌株之間的相關性。在PFGE分型結果方面，2003年醫院臨床來源與食品中毒案例人體分離之MRSA菌株可得18種分型(type)，由分型結果得知醫院來源主要流行菌株與食品中毒來源主要流行菌株並不相同且主要流行菌株之間並無相互流傳情形產生。另一方面與本研究亦利用PFGE對1998及2003年醫院臨床分離來源之MRSA菌株進行分型，結果顯示2003年醫院來源主要流行菌株型態與1998年的流行菌株型態相似度極高。由此可推論此類型的MRSA菌株為此二個時期台灣地區醫院的主要流行菌株。由研究結果得知，相同分型的菌株所造成的MRSA感染情形依然在醫院內流傳。 [英文摘要] ABSTRACT Methicillin-resistant *Staphylococcus aureus* (MRSA) is one of the major pathogens infected in community hospitals, and the incidence of MRSA strains is increasing and becomes a common problem among the hospitals in Taiwan recently. In this study, the polymer chain reaction (PCR) was used to

detect the *mecA* resistant gene, and the *Sma* I restriction enzyme was used to digest the chromosomal DNA of MRSA. In addition, the plasmid profile and the pulsed field gel electrophoresis (PFGE) analysis were used to investigate the distribution of the toxin types for MRSA strains from Veterinary General Hospital (VGH) in Taichung and Center for Disease Control, Taiwan, ROC. (TCDC), and trace the MRSA infection in the hospitals. The PCR results showed that 45 (59.21 %) clinical strains from VGH and 23 (16.3 %) human *S. aureus* strains from food-poisoning cases provided by TCDC possessed *mecA* resistant gene. The ratio of MRSA strains from hospitals was higher than that from food-poisoning cases. As for the distribution for enterotoxin types, it was found that the major enterotoxin types for the strains from hospitals and food-poisoning cases were the enterotoxin A and B, respectively. From the results of the plasmid profiles for MRSA strains, totally 29 distinct plasmid types were found. Of them, no co-shared types were found in the isolates from hospitals and food-poisoning cases. The PFGE results showed that 18 PFGE types were found in the 68 MRSA strains from hospitals and food-poisoning cases in 2003, and the major types for the strains from hospitals were different from those for the strains from food-poisoning cases. In addition, the clinical strains isolated between 1998 and 2003 were found high similarity in PFGE type. The results of this study reveal that the MRSA with same PFGE type still prevail in hospitals. [論文目次]

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