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Older age as a poor prognostic sign in patients with pyogenic liver abscess

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SUMMARY

Background: Previous studies have focused on the role of age as a prognostic factor in pyogenic liver abscess (PLA) and results have been controversial. The aim of this study was to compare the clinical characteristics of PLA in elderly (age ≥65 years) and non-elderly patients in order to identify any differences so that an early diagnosis can be made and appropriate therapeutic measures can be instituted promptly.

Methods: We performed a retrospective analysis of patients with PLA. The demographic and clinical features, laboratory and imaging findings, management, and clinical outcomes of elderly and non-elderly patients were studied.

Results: Between January 2000 and December 2010 inclusive, 319 patients had PLA; 168 (52.7%) were aged ≥65 years. Elderly patients were more likely to have acute onset of symptoms (4.2 vs. 5.3 days, $p < 0.04$), co-morbidities, and respiratory symptoms (25.6% vs. 14.6%, $p < 0.01$). They also had lower serum bilirubin (28.1 vs. 37.1 μmol/l, $p < 0.04$), alanine aminotransferase (71.6 vs. 94.3 U/l, $p < 0.02$), and glycosylated hemoglobin (8.1% vs. 10%, $p < 0.01$), and more often had septal lobulation (64.3% vs. 54.3%, $p < 0.04$) and pneumobilia (10.1% vs. 4.0%, $p < 0.02$). Moreover, they required a longer duration of oral antibiotics (2.63 vs. 2.05 weeks, $p < 0.01$) and had a higher incidence of acute coronary syndrome during the illness (7.7% vs. 2.0%, $p < 0.01$). Gram-negative organisms were the dominant isolates in both groups, but the elderly had a lower incidence of Gram-positive infections (5.4% vs. 13.2%, $p < 0.01$). Lastly, old age was associated with local recurrence of PLA (odds ratio (OR) 3.1, 95% confidence interval (CI) 1.0–9.7, $p < 0.04$) and mortality (OR 3.17, 95% CI 1.25–8.04, $p = 0.015$).

Conclusions: Elderly patients tend to have a more atypical presentation in PLA, for which clinicians should be on high alert. We found older age to be associated with a higher recurrence of PLA and a higher mortality rate.

1. Introduction

Pyogenic liver abscess (PLA) has been recognized since the time of Hippocrates. It is the most common type of visceral abscess; in a report of 540 cases of intra-abdominal abscesses, PLA accounted for 48% of visceral abscesses.[1] In the past, this condition was regarded as a potentially life-threatening condition, with a mortality rate of up to 77%.[2,3] Even with the advances in diagnostic techniques and therapeutic modalities, the case-fatality rate remains within the range of 10–40%.[4–6] One possible reason is the increased mean age of patients with PLA.[7,8] Only a few studies have specifically focused on the role of age in PLA in the past few years,[7,8] with controversial results, probably due either to the lack of an appropriate comparison group or to the small sample size in these studies.[9–12] A recent retrospective study in Taiwan suggested that older patients have a fair outcome when compared to younger patients.[8] Despite having a large sample size, this study only included patients with bacterial pathogens identified in the blood and/or abscess culture. Another retrospective study from Taiwan with a larger sample size, however, revealed that older patients had a higher mortality in PLA and that this might be related to their higher incidence of malignancy and septic shock.[13] Furthermore, a recent nationwide claimed-based retrospective study from Taiwan also reported age as having a negative impact on the prognosis in patients with PLA.[14] Apart from the aforementioned studies from Taiwan, there are no other studies regarding the influence of age on PLA in Eastern Asia. Therefore further studies are warranted to explore how the clinical features and management of elderly patients with PLA differ from those of younger individuals. Knowledge of such differences may heighten clinical suspicion, given the atypical presentation of illness often seen in elderly patients.

In Hong Kong, the geriatric population is growing continuously and the role of advanced age in PLA could be a significant issue. A

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few years ago, Lok et al. carried out a study at our institution and found that PLA in Hong Kong is clinically similar to that in Taiwan.[15] We therefore designed this study to compare the clinical features and management of PLA in elderly and non-elderly patients in order to identify any differences so that an early diagnosis can be made and appropriate therapeutic measures can be instituted promptly.

2. Methods

This was a retrospective analysis in which the records of patients discharged from Tuen Mun Hospital (TMH) in Hong Kong with a diagnosis of pyogenic liver abscess (International Classification of Diseases code 572.0) between January 2000 and December 2010 were reviewed. Cases were identified using the Clinical Data Analysis and Reporting System (CDARS). According to the 2009 census in Hong Kong, there were approximately 1 000 000 residents living in our district. Our hospital is situated in the less affluent part of the city, with a median household income below the average in Hong Kong, and thus residents in our region rely heavily on the subsidized health care service we provide. CDARS is a patient database search engine; this was used to identify patients seen at TMH during the designated period with a diagnosis of PLA.

The case definition required patients to have one or more space-occupying lesions on liver imaging (either ultrasound (US) or computed tomography (CT)), together with either a positive blood/pus culture or the complete resolution of radiological abnormalities following antimicrobial therapy. Patients with amoebic liver abscesses were excluded. Potential cases were identified using CDARS, and their medical records were assessed for eligibility. Patients who fulfilled the above inclusion criteria were divided into two groups: patients $\geq$65 years of age constituted the elderly group and those aged $<$65 years constituted the non-elderly group.

The clinical records of these patients were retrospectively reviewed, with attention to the demographic characteristics, clinical features, laboratory and imaging findings, treatment methods, and final outcomes.

2.1. Looking for the underlying etiology

The PLA was considered secondary to biliary tract disease in patients with a clinical picture of cholecystitis or cholangitis, or a documented biliary ductal abnormality.[16–18] It was ascribed secondary to portal spread when there was a documented infection or abdominal pathology in the distribution of the portal vein. It was considered secondary to hematogenous spread when a documented bacteremic episode with another source of infection was found. Cryptogenic abscess was defined when there was no obvious source of infection after appropriate investigations. Recurrence was defined as the re-development of the clinical and radiological changes subsequent to clinical and/or radiological resolution of the PLA.[19] In-hospital mortality was defined as death resulting directly from the abscess or from a complication of treatment.[19]

2.2. Management strategies

In general, intravenous broad-spectrum antibiotics were given after the initial sepsis work-up. Imaging was carried out in every case of suspected PLA, and percutaneous needle aspiration of the liver abscess was undertaken if the abscess was $>$3 cm in diameter or if there was a feature of ongoing sepsis despite antibiotic treatment. The procedure was usually performed using a 22-gauge Chiba needle under real-time US or CT guidance in the radiology department. The decision for continuous catheter drainage was made by the attending radiologists, and the drainage was done using an 8-French pigtail catheter. Surgical drainage was reserved for patients who failed to respond to antibiotics and percutaneous drainage, or for those who had a surgical indication requiring an open surgical intervention. The purulent material in the abscess cavity was sent for microbiological identification and antimicrobial sensitivity testing. Antibiotic resistance was defined as the ability of a microbial isolate to survive and reproduce in the presence of an antibiotic dosage that was thought to be effective against it. The antibiotic therapy was then adjusted according to the antimicrobial sensitivity of the isolate. The decision to switch to an oral antibiotic counterpart was made by the attending physicians. Lastly, follow-up imaging was performed to confirm the resolution of the liver abscess.

2.3. Statistical analysis

The data were compiled and analyzed using commercial SPSS for Windows software (version 17.0; SPSS Inc., Chicago, IL, USA). All continuous variables were expressed as the mean $\pm$ standard deviation (SD). Categorical variables were reported as percentages. Univariate analysis was initially used to screen for potentially useful variables associated with mortality, and in order to avoid the premature exclusion of useful predictors due to a lack of statistical power, those variables with $p < 0.2$ were selected for multivariate logistic regression analysis to identify their independency associated with mortality. Odds ratios (ORs) and their 95% confidence intervals (CIs) were estimated in the regression model. The Student's *t*-test, Chi-square test, Fisher's exact test, and Mann–Whitney *U*-test were used when appropriate. Two-sided *p*-values of $<$0.05 were considered to be statistically significant.

There were only 17 cases of local recurrence of PLA during the study period and such a limited number precluded any regression analysis, so Chi-square testing was used instead to explore associations between factors of interest and local recurrence.

3. Results

3.1. Demographic characteristics

Three hundred sixty-seven patients were selected using CDARS for the diagnosis of PLA between January 2000 and December 2010. Forty-eight of these patients did not meet the eligibility criteria, of whom 21 did not have any imaging before their death and their diagnosis of PLA was provisional, 13 had a hepatic neoplasm (hepatocellular carcinoma in eight and cholangiocarcinoma in five patients) without any septic component inside, 12 patients were given an incorrect diagnostic code, and the remaining two patients had hepatic amoebic abscesses. Thus, during the designated period, a total of 319 patients were diagnosed with PLA; of these, 168 (52.7%) were aged $\geq$65 years.

The crude annual incidence rate during the 11-year period was 2.9 per 100 000 population (range 0.9–5.3) and the corresponding incidence rate in the elderly during the same period was 1.53 per 100 000 population (range 0.4–2.6) (Figure 1). The incidence rates in both groups increased to a similar extent.

The demographic characteristics of these patients are shown in Table 1. The male dominance was greater in the non-elderly group ($p < 0.03$). The mean age at presentation was 77.3 years (range 65–97 years; median 77.3 years) in the elderly group and 52.6 years (range 24–64 years; median 55 years) in the non-elderly group. Major co-morbidities in the two groups included diabetes mellitus, hypertension (39.3% vs. 17.9%, $p < 0.01$), ischemic heart disease (13.1% vs. 4.0%, $p < 0.01$), and stroke (16.1% vs. 4.0%, $p < 0.01$), with statistically significant differences between the elderly and non-elderly groups for the latter three entities.