Pyogenic liver abscess (PLA) remains a health problem in Taiwan. The annual incidence of PLA in Taiwan was 17.5 per 100,000 individuals in 2004, in contrast to only 2.3 and 3.6 per 100,000 individuals in Canada and the United States in 2003 and 2005, respectively. In Taiwan, *Klebsiella pneumoniae* is the leading pathogen, presenting in 78–80% of culture-confirmed cases, which is different from Western countries, where the most frequent etiological agents of PLA are *Streptococcus, Escherichia coli, Staphylococcus,* and anaerobic bacteria. The initial clinical symptoms and signs of PLA were not significantly different in both *K. pneumoniae* and non-*K. pneumoniae* patients. However, the *K. pneumoniae* patients were more likely to be younger and frequently associated with diabetes mellitus (DM) and had a high incidence of septic endophthalmitis (mostly due to serotypes K1 and K2 *K. pneumoniae*) and other metastatic infections, but with a lower mortality. The non-*K. pneumoniae* patients were more likely to be older and frequently associated with malignancy and had a higher mortality.

In the latest issue of the *Journal*, Kang and Hwang analyzed 2319 cases of PLA from the National Health Insurance database of Taiwan in 2007 and reported that older patients (age ≥65 years) had a higher rate of gastroenterological cancers compared to younger patients (age <65 years). Our recent investigation further explored the association between hepatocellular carcinoma and PLA. The impact of advanced age on PLA was also addressed in this study. We found that around 2% (698/32,454) of PLA patients in Taiwan presented with the disease as the initial manifestation of underlying hepatocellular carcinoma. Age ≥65 years was one of the independent risk factors. Physicians should not ignore the possibility of underlying hepatocellular carcinoma in PLA patients with advanced age.

In older patients with PLA, a variety of microorganisms could be identified. In addition to *K. pneumoniae*, other causative agents such as *E. coli* and polymicrobial with or without anaerobic bacteria were also more frequently found in older patients. Previous studies revealed that a high ratio of hepatobiliary malignancy was found in non-*K. pneumoniae* patients. Physicians should pay attention to the associated malignancy in geriatric PLA patients, which can lead to a poor prognosis.

Kang and Hwang reported that older patients had longer hospital stays and higher in-hospital mortality rate. Indeed, polymicrobial infections with or without anaerobes and multidrug-resistant Gram-negative rod infection in non-*K. pneumoniae* patients made it difficult to choose the appropriate antibiotics empirically but did not affect the mortality rate due to aggressive aspiration/drainage of the abscess. Chen et al also found that older PLA patients with *K. pneumoniae* even had a better prognosis than those without *K. pneumoniae*. Therefore, they proposed that case fatality in older PLA patients was possibly related to host conditions, rather than to the characteristics of PLA itself. In another large series of culture-confirmed PLA investigation, it was shown that malignancy and septic shock increased the mortality of PLA. A previous nationwide study suggested that renal disease and malignancy correlated with higher death rates in all PLA patients.

It is noteworthy that there was no significant difference in frequency of DM between the different age groups, which is also consistent with that reported in the literature in Taiwan. The current nationwide registry once again stressed the association between diabetes and liver abscess, regardless of age. However, diabetes could affect the neutrophil function by decreasing chemotaxis and phagocytosis and increasing the susceptibility of bacterial infections. Lin et al demonstrated that neutrophil phagocytosis of serotypes K1/K2 *K. pneumoniae* was lower in patients with DM compared to that in normal healthy individuals but without difference in phagocytosis of non-K1/K2 isolates. This explains why we found a high ratio of K1/K2 *K. pneumoniae* causing PLA with complicated endophthalmitis in diabetic patients.

The strengths of the present study are that it is based on a large nationwide population-based sample, contains data on a wide variety of demographic characteristics, and has a complete history of the medical services used by the sampled patients. Although this approach suffers from the limitation of precluding the investigation of many interesting clinical details, including laboratory findings, it does have the advantage of being able to study large numbers of patients. Another limitation is that the National Health Insurance database does not include culture data. As we know, PLA is not like amebic liver abscess, which is caused by only one etiological agent. Nevertheless, Kang and Hwang’s study provides a clear picture of the impact of age on PLA in Taiwan. Further investigation regarding the microbiology, management, clinical features, and outcome of elderly PLA patients is necessary to tackle this problem in the future.
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