Diabetes Mellitus, Insulin, and Melioidosis in Thailand

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A review of case records for 1817 Thai patients with melioidosis revealed that <10% of the 382 patients with diabetes mellitus were insulin dependent. This provides evidence against the hypothesis that insulin deficiency contributes to the known susceptibility to melioidosis in patients with diabetes mellitus.

Underlying diabetes mellitus is a major predisposing factor for melioidosis [1–4]. The relative risk of melioidosis in diabetic patients in northeast Thailand has been estimated to vary between 7.5 and 100.1, depending on age and sex [1]. It has been reported that insulin inhibits growth of the causative organism Burkholderia pseudomallei in vitro [5]. It has been shown subsequently that this finding may be an artifact due to the presence of a preservative, m-cresol, in the insulin preparation used in the original experiments [6]. A similar finding has been reported for the closely related organism Burkholderia cepacia [7]. The reported inhibitory effect of insulin on B. pseudomallei must therefore be regarded with caution.

It has also been claimed that there is conclusive clinical evidence of insulin-dependent (type I) diabetes predisposing to melioidosis; that is, that diabetic patients with melioidosis are insulin-deficient [5, 8]. More recently, in a textbook on travel medicine [9], it was claimed that insulin plays a role in the modulation of pathogenesis in melioidosis. If correct, this would be consistent with the original experimental findings [5]. Both original articles quoted in support of these claims report an incidence of diabetes mellitus of >30% in series of 63 [2] and 50 [3] cases of septicemic melioidosis. However, as neither article provides any data on the prevalence of insulin dependence among the diabetic patients, there are no clinical data to support the hypothesis that insulin deficiency, per se, predisposes to melioidosis [2, 3]. Indeed, Australian experience with cases of melioidosis suggests that the opposite is true: the vast majority of cases of diabetes mellitus (38 [95%] of 40 cases) in 1 series of 100 patients with melioidosis were not insulin dependent [10].

We have therefore reviewed retrospectively the case records of patients with melioidosis (excluding patients who had experienced relapses) admitted to Sappasitprasong Hospital (Ubon Ratchathani, northeast Thailand), in order to determine the relative importance of insulin-dependent diabetes mellitus in predisposing diabetic patients to melioidosis. Between September 1986 and October 1998, 1817 patients were admitted with culture-confirmed melioidosis, of whom 382 (21.0%) had previously received a diagnosis of diabetes mellitus. Data on the management of blood glucose levels prior to admission were available for 242 patients. Of these, only 23 patients (9.5%) were dependent on insulin for glycemic control. An additional 200 patients (82.6%) were being treated with orally administered hypoglycemic agents (mainly glibenclamide). For 19 patients (7.9%), blood glucose levels were being managed by diet alone. We consider that, although no data were available for the remaining 140 known diabetic patients, it is unlikely that their glycemia was being actively managed. Insulin preparations were widely available in the community, and few patients in need of insulin would not have had access to it. Thus our calculation that 9.5% of diabetic patients were insulin-dependent is likely to be an overestimate. These findings are consistent with those reported from northern Australia [4, 10].

Patients with diabetes mellitus in rural Thailand are often young, thin adults who do not require insulin to maintain good blood glucose levels. They do not appear to have low serum insulin levels compared with control subjects [11]. The available clinical evidence indicates that factors other than insulin deficiency are responsible for the predisposition to melioidosis in diabetic Thai patients. The more likely reason for this predisposition is the known impairment of neutrophil functions (impaired chemotaxis, phagocytosis, and killing) [12] that occurs in patients with diabetes mellitus (and, similarly, in patients with renal impairment [13], which also predisposes to melioidosis [1, 14]).
References