

ABSTRACT

Clinical validation of a novel in-house bedside screening test for venom-induced consumption coagulopathy (VICC) following Indian viperid envenomings



Most snakebite endemic countries around the world rely on the 20-minute Whole Blood Clotting Test (20WBCT) to screen, monitor progression and establish resolution of venom induced consumption coagulopathy (VICC). While the 20WBCT is simple and affordable, the time required to read test-results can be cumbersome, especially in busy emergency settings. Rural primary health centres, which most snakebite victims initially visit, are often crowded and understaffed. Many studies point to undue delays in reading 20WBCT results owing to the multiple pressing clinical tasks that require completion during initial assessment and stabilization of patients in such settings. Delays in reading the WBCT beyond the 20th minute run the risk of false-positive results due to clot dissolution or false-negative results due to an unstable and often transient clot. These erroneous interpretations can have detrimental consequences when used to guide treatment-related decisions in snakebite victims.

In this study, we present a novel bedside test for VICC which significantly shortens test-reading times through manually triggered blood clotting [termed the manually activated clotting test (MACT)]. The test was clinically validated in a prospective cohort of snakebite patients over a one-year period, using the International Normalised Ratio (INR) as gold standard. Receiver operating characteristic (ROC) analysis was used to determine the optimal cut-off point and diagnostic accuracy. Of 66 consecutive snakebite patients over one year, 37 had VICC (defined as INR >1.2 with or without overt bleeding manifestations) and 29 were controls (no VICC). 84% had already received variable volumes of antivenom prior presentation. The median [IQR] PT/INR and aPTT at admission were 22 seconds/1.96 [12.20 - >120 seconds/1.1.2- >10] and 34.5 seconds (25-121.2 seconds) respectively. ROC analysis revealed an optimal test cut-off point at 225 seconds with area under the curve (AUC), sensitivity and specificity values as 96%, 88.6% and 96.8% respectively.

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Clinical validation of a novel in-house bedside screening test for venom-induced consumption coagulopathy (VICC) following Indian viperid envenomings

全球盛行蛇咬傷的國家大多使用20分鐘全血凝血試驗(20WBCT)來檢驗及評估毒蛇咬傷所引起的消耗性凝血病 (venom-induced consumption coagulopathy, VICC)，雖然20WBCT簡易且經濟實惠，但於緊急情況下顯相對耗時。於印度，大多數蛇咬傷患者會先送往農村初級衛生保健中心就醫，保健中心往往人滿為患且人手不足。許多研究指出，於緊急狀況下為了先穩定及評估患者，可能耽誤了WBCT的閱片結果，而導致血塊溶解出現偽陽性，或是錯過短暫出現的血栓而出現偽陰性判讀的風險，錯誤的判讀結果可能會不利於蛇咬傷患者接受適當的治療處置。

在這項研究中，我們推出了一種新的 VICC 床邊篩檢測試，以人工觸發血液凝固 (manually activated clotting test, MACT)，顯著縮短了檢驗時間。以國際標準化比值(international normalized ratio, INR)作為標準，進行了為期一年的前瞻性的研究。以ROC曲線法(receiver operating characteristic)分析最佳診斷的截斷點(optimal cut-off point)以及診斷的準確性。有66名蛇咬傷患者，其中37例有VICC（定義為 INR >1.2，不一定有明顯出血表徵），29例對照組(無VICC)，84%的患者於檢驗前已注射抗蛇毒血清。入院時 PT/INR 的中位數為22秒/1.96，四分位距(interquartile, IQR)為12.20→120秒/1.12→10，aPTT 的中位數為34.5秒(25-121.2秒)。ROC 分析顯示225 秒為最佳測試截斷點，曲線下面積(area under the curve, AUC)、靈敏度和特異性值分別為 96%、88.6% 和 96.8%。