

## **EFFECT OF STRENUOUS LIVE-FIRE FIREFIGHTING DRILLS ON HEMATOLOGICAL AND PSYCHOLOGICAL MEASURES**

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Fire fighting activity involves strenuous physical work in heavy protective gear and often exposes fire fighters to extreme radiant heat loads. Thus, fire fighting presents an excellent model to study physiological and psychological responses to acute, extreme heat stress in humans. The purpose of this study was to describe the effects of strenuous live-fire fire fighting drills on selected hematological and psychological variables and to document the extent to which these variables recovered following 1.5 h of recovery. The extent of recovery is particularly important in this population as fire fighters often work a 24 hour shift and may be required to respond to another fire at any time. Eleven apparently healthy, male, professional firefighters performed three trials of a standardized set of fire fighting tasks in a training structure that contained live fires. Blood was drawn prior to the start of the tasks, immediately post fire fighting activity, and after 90 min of recumbent recovery. Psychological data were collected at the end of each trial. Plasma volume decreased by 15% immediately post fire fighting activity, but returned to baseline following recovery and aggressive rehydration. During the recovery period the fire fighters consumed an average of about 1.5 L of cold water. The decrease in plasma volume immediately following fire fighting activity was accompanied by increases in hemoglobin and hematocrit. Consistent with the observed hemoconcentration, several of the nineteen blood chemistry variables increased significantly immediately post fire fighting activity, and returned to baseline values following recovery. Blood glucose values were significantly lower than pre-test or post-fire fighting values after 90 minutes of recovery. These data emphasize the need for aggressive fluid replacement following strenuous fire fighting activities and suggest that fire fighters may benefit from carbohydrate replacement prior to subsequent activity.

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