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POSTER PRESENTATION

Open Access

T-helper cell polarisation following severe polytrauma

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Introduction

Severe polytrauma induces an immunosuppressive response and is associated with a very high incidence of nosocomial infections. Previous studies have inferred that this detrimental immune response results from polarisation of the T helper (T_h) response towards an anti-inflammatory, T_H2 dominated, response at the expense of a bactericidal, T_H1 response [1].

Objectives

1) To define alterations in T_H cell subsets following severe blunt polytrauma.

Methods

Patients presenting to the emergency department within 2 hours of severe polytrauma were eligible if intubated either at the scene or in ED. Isolated head injuries and those not expected to survive 24 hours were excluded.

EDTA anti-coagulated blood was drawn at 0hr (within 2 hours of injury), at 24 and 72hrs. Samples were immediately lysed, washed, stained and analysed using a standardised human 8-colour T_H 1, 2 & 17 panel [2] on an LSR II flow cytometer. A paired white cell count differential was obtained at each sampling point. Patients were followed until discharge or death. Data were analysed using non-parametric statistics, with results presented as median and IQR.

Results

15 consecutive severe polytrauma patients requiring Intensive Care Unit (ICU) admission were recruited. Demographic and clinical data are outlined in Figure 1. Twelve (80%) lymphocytosis ($3.3 \times 10^9/L$, 2.5 - $4.4 \times 10^9/L$) (Figure 2A). At 72 hours leukocytes had fallen ($P < 0.01$, figure 2A) such that 6 (54%) of those surviving were lymphopenic ($0.9 \times 10^9/L$, 0.6 - $1.2 \times 10^9/L$). Circulating

Table 1. Patient demographics

Age	33 (22 - 59.25)
Male	9 (60%)
Scene systolic BP	95 (56 - 127)
Admission pH	7.15 (7.00 - 7.29)
Admission BD	8.1 (4.3 - 19)
ISS	38 (29 - 51)
Blunt Injury	12 (80%)
PRBCs transfused over first 24hrs	15 (5 - 22)
28 day mortality	7 (47%)

BP, Blood pressure; BD, Base deficit; ISS, Injury Severity Score; PRBCs, Packed Red Blood Cell transfusions over first 24 hours. Data expressed as median and interquartile range or number and percentage.

Figure 1

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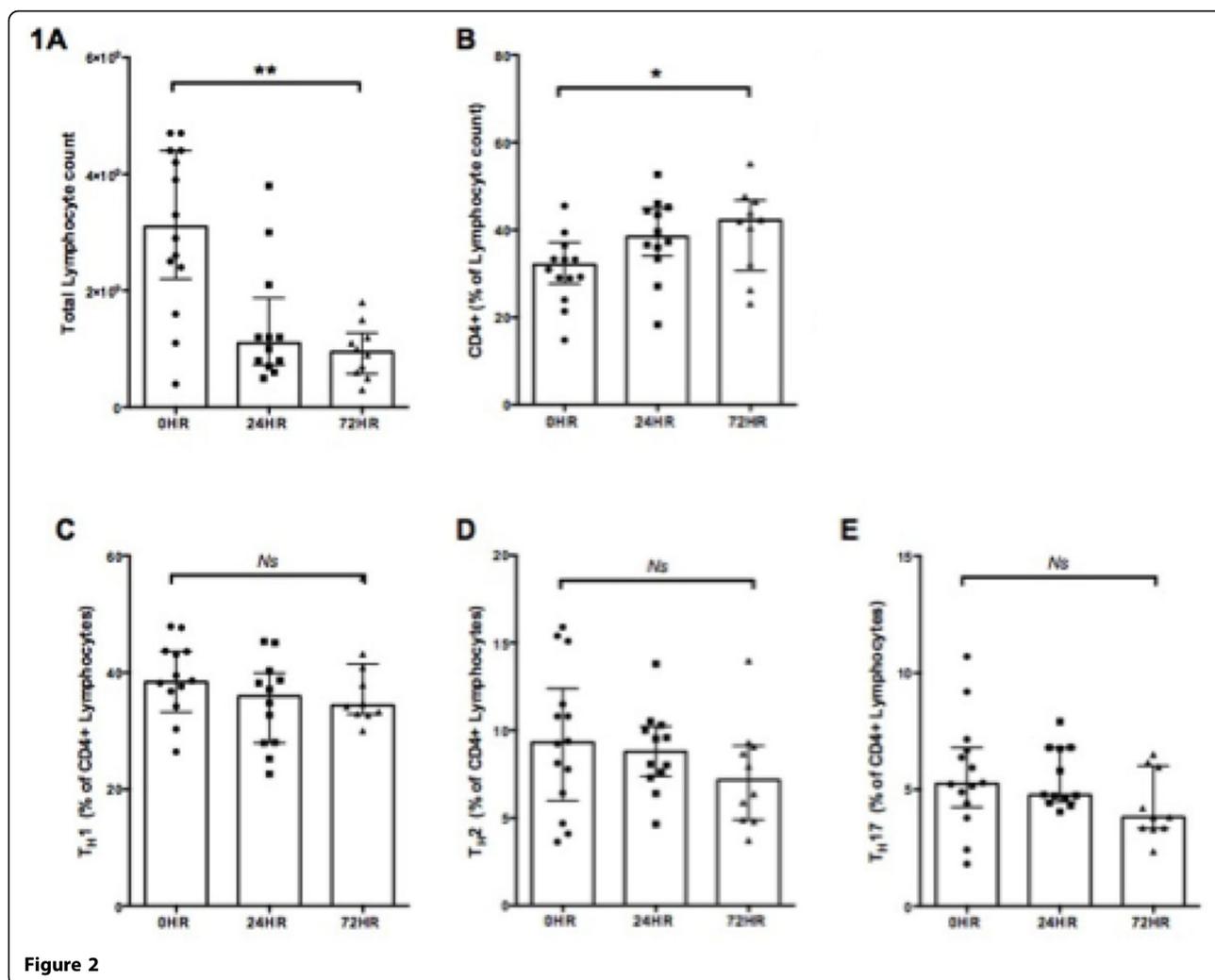


Figure 2

CD4⁺ ($P = 0.01$; Figure 2B) and CD4⁺CD25⁺ ($P < 0.05$) lymphocytes increased over 72 hours. When expressed as a percentage of total circulating lymphocytes no significant change in the proportions of the T_H 1, 2 & 17 subpopulations was detected (Figure 2C-E).

Conclusions

Severe polytrauma patients swiftly become lymphopenic. Although a failure to normalise this during the ICU stay correlates with higher mortality [3] our study of T_H cell subtypes demonstrates no evidence of a switch to a detrimental anti-inflammatory T_H2 subtype at the expense of the potentially protective bactericidal T_H1 subtype.

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