PublisherInfo		
PublisherName	:	BioMed Central
PublisherLocation	:	London
PublisherImprintName	:	BioMed Central

Gut oedema precipitates acute or chronic cardiac failure

ArticleInfo		
ArticleID	:	4130
ArticleDOI	:	10.1186/ccf-1999-661
ArticleCitationID	:	661
ArticleSequenceNumber	:	67
ArticleCategory	:	Paper Report
ArticleFirstPage	:	1
ArticleLastPage	:	3
ArticleHistory	:	RegistrationDate : 1999–6–16 OnlineDate : 1999–6–16
ArticleCopyright	:	Current Science Ltd1999
ArticleGrants	:	
ArticleContext	:	130541111

Jonathan Ball

Keywords

Bacterial translocation, cardiac failure, diuretics, endotoxin, immune activation

Comments

The concept that hypoperfusion/venous congestion of the bowel may cause a negative effect on the heart in the setting of worsening congestive cardiac failure fits well with some of the current concepts of acute cardiac failure seen in some patients with overwhelming sepsis. The accompanying Commentary to this paper points out the limitations of the authors' model, namely that bowel oedema (a sign of decompensation) must be present in order to trigger the bacterial/endotoxin translocation. This fails to explain what initiates the decompensation and also the finding of immune activation, in this and other studies, in the absence of gut vascular congestion. Further concerns are raised, both by the authors and the commentator, regarding the persistence of immune system activation following therapy to resolve the peripheral oedema. Overall, this study adds some evidence to the idea that deranged bowel perfusion may have important deleterious effects on other organs, especially the heart.

Introduction

A distinctive profile of cytokine production, indicating immune system activation, is seen in congestive cardiac failure. There is good evidence that cardiac myocytes are themselves largely responsible for this production, although the underlying mechanisms are unknown. One potential stimulus is gut bacterial endotoxin which might undergo translocation due to hypoperfusion and/or venous congestion of the bowel.

Aims

To investigate the theory that endotoxin and cytokine concentrations increase in acute exacerbations of chronic congestive cardiac failure, and fall with both short and long term diuretic therapy.

Methods

Three groups were compared: age matched healthy volunteers (14); stable chronic cardiac failure patients (20); and chronic heart failure patients who had developed acute, moderate to severe peripheral oedema (20). Blood was taken for estimations of endotoxin, lipopolysaccharide binding protein (LBP), TNF alpha, soluble TNF receptors 1 & 2, interleukin 6 (IL-6), soluble CD14 and procalcitonin. A total of 10 of the patients in the acute or chronic group were re-studied within a week of complete resolution of oedema (median 14 days). Of the remaining 10 patients, five regained long-term stability of symptoms and were studied after 3 months. The final five did not respond to therapy.

All of the healthy volunteers, 10 of the stable patients, and seven of the acute or chronic patients also underwent lymphocycte subtype analysis by labelled antibody flow cytometry.

Results

Patients with acute or chronic cardiac failure had worse renal function and significantly higher levels of endotoxin, TNF alpha, TNF receptors 1 & 2, soluble CD14, IL-6 and C-reactive protein than the other two groups. Levels of LBP and procalcitonin were not significantly different. One week following diuretic treatment, levels of endotoxin had fallen significantly, whereas cytokine levels remained unchanged. In the group who enjoyed 3 months stability, there was a trend towards normalisation of cytokines.

Discussion

These results support the theory that endotoxin may be the stimulus that provokes the inflammatory response observed in cardiac failure patients. The observation that endotoxin levels fall with diuretic therapy but that immune activation remains, raises questions of immunomodulation which remain unanswered. The origin and importance of this endotoxin remains speculative, but may represent a target for future therapeutic strategies.

References

1. Niebauer J, Volk HD, Kemp M, Dominguez M, Schumann RR, Rauchhaus M, Poole-Wilson PA, Coats AJS, Anker SD: Endotoxin and immune activation in chronic heart failure: a prospective cohort study. Lancet. 1999, 353: 1838-1842.