

Long-Term Cardiac Dysfunction Following Severe Burn Injury

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This prospective observational study provides some hard data about serious cardiac injury persisting after major pediatric burn injury. I wish the authors had provided a bit more clarity in the Methods section of the report.

Source: Hundeshagen G, Herndon DN, Clayton RP, et al. Long-term effect of critical illness after severe paediatric burn injury on cardiac function in adolescent survivors: an observational study.

Lancet Child Adolesc Health 2017; 1:293-301;

doi.10.1016/S2352-4642(17)30122-0. See **AAP Grand Rounds commentary** by Dr. David Spar (subscription required).

I scan a large number of medical journals looking for articles that might change my clinical practice, and my approach is what I try to convey in Evidence eMended. When I come across an article that the title or abstract suggests could be relevant to my practice, I jump straight to the Methods section to assess potential bias or fatal flaws in the study design, before I even worry about the study's findings. For this article on cardiovascular complications following pediatric burn injury, that section left me with a couple of questions regarding risk of bias in the study.

The study findings still are of interest. The study population consisted of 40 children who sustained at least 30% body surface area burns and received acute burn care at the Shriners Hospital for Children in Galveston, TX, for a minimum of 5 years preceding the current study. Based on extensive cardiovascular evaluations, they found that a little under half of the children had low systolic ejection fraction on echocardiography and that about 70% had evidence of restricted left ventricular function. Twenty percent had evidence of myocardial fibrosis. Based on the **New York Heart Association classification system for heart failure**, one third had mild symptoms of heart failure and 3% had marked limitation in activity due to heart failure symptoms. That's a big chunk of this study population, certainly deserving of close long-term follow up.

But what about my concerns about the report itself? I found a few limitations that weren't mentioned in the discussion section. First, the study employed a convenience sample of age-matched control subjects, numbering 25. The authors give us virtually no details about how these individuals were selected. The term convenience sample would suggest they came to the Shriners Hospital for other reasons, yet why would a healthy child be seen at a tertiary burn center? Were these subjects brought to the institution specifically for the study? (As an aside, the authors had a definite boo-boo in their Table 1 listing participant characteristics. They performed statistical testing and reported a p-value for the difference between the ages of the study patients and controls. Since the controls were chosen to have the same age as subjects, that makes no sense. Fortunately, the p-value was not significant!)

A second issue is that we have little information about the interpretation of echocardiograms. Echocardiography measurement can be subjective, and therefore it is important to explain whether those interpreting the studies were blinded to the clinical histories of the subjects. The authors didn't supply this, so I assume the interpretations were not blinded and therefore could have introduced some bias to the results.

Another important part of the study looked at several biomarkers, mainly cytokine measurements, obtained during the acute burn treatment and in follow up. The fact that there was a relationship between some cytokines and degree of cardiac dysfunction sheds some insight into the pathogenesis of the problem as well as perhaps directing future studies looking at prognostic factors.

So, this study provides us with some useful information, particularly since it's difficult to keep a cohort of patients together for prolonged follow up studies. The concerns about reporting details in the Methods section should have been corrected by the journal reviewers and editors; I'm sure the authors could have provided the missing details if asked. This is a new journal, its first issue was in September 2017, but even more established publications have similar omissions appear in print. The best reviewers and editors anticipate questions readers will have and strive to answer them proactively.

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