

# Effect of intravenous positive inotropic therapy on myocardial damage in patients with dilated cardiomyopathy

## *Dilate kardiyomiyopatili hastalarda intravenöz pozitif inotropik tedavinin miyokard hasarı üzerine etkisi*

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Myocyte loss occurring due to myocardial apoptosis or necrosis play a major role in the progression of heart failure from early to end stages (1). Administration of positive inotropic agents such as dopamine and dobutamine has been shown to have a toxic effect on cardiomyocytes over the long term, resulting in shorter survival times (2, 3).

Patients presenting with symptoms and findings of congestive heart failure (CHF) (NYHA class III-IV, ejection fraction < 40%) despite conventional therapy were enrolled in our study. Patients were divided into two groups with respect to the positive inotropic therapy (dopamine and dobutamine groups). Blood samples were collected at a set time daily before, during, and one week after the 5-day therapy. Cardiac troponin-I (cTn-I) scores were recorded at one week after the completion of therapy in the dopamine group were significantly lower with respect to days 1, 3, 4 and 5 values recorded during the therapy ( $p < 0.04$ ). Similarly, cTn-I levels recorded at one week after the conclusion of the therapy in the dobutamine group were observed to be significantly lower with respect to days 1, 2, 3 and 5 values recorded during the course of the therapy ( $p < 0.02$ ). Although cTn-I levels observed on the 2nd day of therapy in the dopamine group and on the 4th day of therapy in the dobutamine group were higher than those recorded at one week after the completion of therapy, difference between the days was not statistically significant ( $p > 0.05$ ). Likewise, cTn-I levels measured daily in both groups during the five days of therapy were higher than pre-treatment values but the difference was not statistically significant ( $p > 0.05$ ). No significant differences were observed in pre-, during and post-therapy in cTn-I levels when the groups were compared in terms of the effect of dopamine and dobutamine therapy on cTn-I levels ( $p > 0.05$ ).

The relationship between positive inotropic therapy and increased incidence of clinical events over the long-term is complex and has many factors. Related studies, mostly carried out by using dobutamine emphasized the fact that these agents triggered or accelerated apoptosis, leading to increased myocardial damage over the long-term. (3). Extensive FIRST study reported that patients administered with intravenous dobutamine have higher rates of

mortality (2). Increased mortality following intravenous administration of dobutamine was attributed to sudden cardiac death due to dobutamine induced progressive pump deficiency and arrhythmias in the FIRST study. Eryol et al. (4) established that while only one patient was cTn-I positive before the therapy started, four patients had become cTn-I positive by the end of the 3rd month in a study conducted on patients with dilated cardiomyopathy, investigating the long-term effects of intermittent dobutamine therapy on cTn-I. They concluded that towards the end-stages of the therapy, as the beneficial effects of dobutamine started disappearing, its detrimental effects in the form of an increase in cTn-I levels became more pronounced.

In conclusion, positive inotropic agents have beneficial hemodynamic effects in the short-term, but lead to progression in heart failure as well as increasing the risk for sudden death. It has been demonstrated that these agents accelerate the existing myocyte damage by increasing apoptosis. Presented study shows that, even a 5-day administration of positive inotropic agents (dopamine and dobutamine) results in increased cTn-I levels; the decrease in cTn-I levels after withdrawal indicates the small amount of myocardial damage cause by these agents cause can be repaired by discontinuation of therapy.

### References

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