Impact of Vein of Marshall Alcohol Ablation on Postprocedural Serum Ethanol Concentrations

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INTRODUCTION

Atrial fibrillation (AF) is the most common sustained arrhythmia. The Vein of Marshall (VOM) alcohol ablation technique has been introduced as a complementary procedure during catheter ablation to reduce AF recurrence, particularly in patients with persistent AF. Ethanol is directly injected into the vein to induce localized necrosis of the surrounding myocardial tissue. While the efficacy of this technique in reducing AF recurrence is well-documented, concerns exist regarding systemic absorption of ethanol and its potential effects on postprocedural serum ethanol levels. (1) The goal of this study is to assess the serum ethanol concentrations following the VOM alcohol ablation procedure and explore the relationship between ethanol levels and clinical factors like left atrium size and body mass index (BMI).

METHODS

This prospective study included 20 patients undergoing VOM alcohol ablation as part of their treatment for atrial fibrillation. Blood samples were collected at baseline (before the procedure) and at specific intervals post-procedure (30 minutes and 1 hour). Serum ethanol concentrations were measured using standard laboratory methods and clinical parameters such as heart rate, blood pressure, and liver function tests were monitored to assess the systemic effects of ethanol.

RESULTS

Mean value at baseline alcohol, alcohol after 30 min and 60 min was 0.09 (0.04), 0.13 (0.04) and 0.10 (0.0). The level of alcohol between baseline and after 30 min increased by 44.0% (p=0.124) and decreased by 23.0% from 30 min to 60 min (p=0.124). Alcohol level at baseline and after 60 min remained unchanged (p=0.995). The correlation between administred ethanol and serum levels suggests that ethanol absorption is midest and transient. Larger left atrium and higher BMI with lower ethanol concetntrations at 30 minutes. No patient experienced ethanol concentrations high enough to cause systemic toxicity or noticeable clinical effects such as altered consciousness, hypotension, or hepatic dysfunction.

DISCUSSION

The results indicate that VOM alcohol ablation does lead to measurable increases in serum ethanol concentrations, though these levels remain well below the toxic threshold. The transient nature of the increase suggests that systemic absorption is limited and the body efficiently metabolizes the ethanol within hours of the procedure. The metabolic response to the ethanol injection appears to vary minimally between individuals, with most patients exhibiting a rapid clearance of ethanol from their system. This finding aligns with the short half-life of ethanol and its rapid distribution and metabolism in the liver. The procedure remains a safe and effective option for reducing atrial fibrillation recurrence, with minimal systemic ethanol exposure.

References:
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