CASE REPORT

Supraventricular tachyarrhythmias that responded dramatically to bisoprolol transdermal patches in two patients undergoing hemodialysis

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Abstract

We here report two patients with atrial flutter (AFL) and paroxysmal supraventricular tachycardia (PSVT) who were undergoing hemodialysis and returned quickly to normal sinus rhythm without hypotension when treated with bisoprolol transdermal patches (Bisono[®] Tape) (TOA EIYO, Tokyo, Japan). Spontaneous rhythm reversion had not occurred prior to these events in either patient. Our findings indicate that Bisono[®] Tape may be a new and more effective treatment for AFL and PSVT in patients undergoing hemodialysis.

KEYWORDS

atrial flutter, bisoprolol, hemodialysis, paroxysmal supraventricular tachycardia, transdermal patch

1 | CASE REPORT

Patient 1 was a 71-year-old man undergoing hemodialysis. Although he originally had sinus rhythm, electrocardiography (ECG) revealed a 2:1 AFL with a heart rate (HR) of 132 beats/min (Figure 1a). After application of a 4 mg bisoprolol transdermal patch (Bisono[®] Tape, Bisono Tape PK Study, 2016), the HR dropped into the 90s beats/min range within 2 min; however, AFL persisted. Twelve minutes later, the HR returned to about 80 beats/min with sinus rhythm (Figure 1b). Figure 1c shows changes in the HR. The planned hemodialysis was completed (water removal 3.4 kg).

Patient 2, a 66-year-old woman undergoing hemodialysis, was noted to have PSVT with a HR of 142 beats/min (Figure 2a). After application of a 2 mg Bisono[®] Tape, the HR gradually fell to 120 beats/min. Seventeen minutes later, the ECG suddenly returned to sinus rhythm with a rate of 77 beats/min (Figure 2b). The planned hemodialysis was completed (water removal 1.5 kg). Figure 2c shows the changes in HR. Spontaneous rhythm reversion had not

occurred prior to these events in either patient; the same results were obtained when Bisono[®] Tape was subsequently used for other tachyarrhythmias.

2 | DISCUSSION

It is difficult to restore AFL to sinus rhythm with medications such as intravenous beta blockers or adenosine and intravenous flecainide has an efficacy rate of only 10% to 28% (Hohnloser & Zabel, 1992). Additionally, verapamil is effective for PSVT. However, the BP decreases when verapamil is used in patients undergoing hemodialysis, hindering water removal. Bisono[®] Tape (4, 8 mg) was first marketed in Japan in 2013, the 8 mg tape dose having a hypotensive effect equivalent to that of a 5 mg bisoprolol tablet. A double-blind clinical study of 5 mg bisoprolol tablets, 8 mg Bisono[®] Tape, and placebo in 459 patients with hypertension demonstrated noninferiority of the hypotensive effect of the tape compared with the oral medication (Matsuoka, Kuwajima, Shimada,

FIGURE 1 Electrocardiogram showing atrial flutter with a rate of 132 beats/min (a). Electrocardiogram showing reversion to sinus rhythm with a rate of 80 beats/min. (b). Graph showing changes in heart rate (c). A 4 mg Biso[®] Tape was applied at 12:20. The atrial flutter reverted to sinus rhythm with a rate of 80 beats/min at 12:32

Mitamura & Saruta, 2013). Additionally, Biso[®] Tape 8 mg has reportedly been used for 7 days in patients with hypertension and normal, mild, or severe renal dysfunction. In individuals with renal dysfunction, the maximum blood concentration (C_{max}) of bisoprolol is reportedly approximately 1.2-fold (mild renal dysfunction), 1.7-fold (moderate renal dysfunction), and 2.4-fold (severe renal dysfunction) higher than in individuals with normal renal function. Therefore, Biso[®] Tape appears to act more quickly and to be more potent in patients with renal failure than in individuals with normal renal function.

Our findings indicate that Biso[®] Tape may be a new and more effective treatment for AFL and PSVT in patients undergoing hemodialysis.

3 | CONCLUSION

We here present two patients undergoing hemodialysis with AFL and PSVT who reverted quickly to normal sinus rhythm without hypotension when treated with Biso[®] Tape.

CONFLICT OF INTEREST

None declared.

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FIGURE 2 Electrocardiogram showing paroxysmal supraventricular tachycardia with a rate of 142 beats/min (a). Electrocardiogram showing reversion to sinus rhythm with a rate of 77 beats/min (b). Graph showing changes in heart rate (c). A 2 mg Biso[®] Tape was applied at 10:48; at 11:05 the electrocardiogram showed sudden restoration of sinus rhythm with a rate of 77 beats/min

REFERENCES

- Bisono Tape PK Study (2016). Investigation of PK and safety in hypertensive patients with renal disorders (BTP 0408) in-house document of TOA EIYO Pharmaceutical Company.
- Hohnloser, S. H., & Zabel, M. (1992). Short- and long-term efficacy and safety of flecainide acetate for supraventricular arrhythmias. *American Journal of Cardiology*, 70, 3A-9A. [https://doi.org/10.1016/0002-9149\(92\)91071-B](https://doi.org/10.1016/0002-9149(92)91071-B)
- Matsuoka, H., Kuwajima, I., Shimada, K., Mitamura, H., & Saruta, T. (2013). Comparison of efficacy and safety between bisoprolol transdermal patch (TY-0201) and bisoprolol fumarate oral formulation in Japanese

patients with grade I or II essential hypertension: Randomized, double-blind, placebo-controlled study. *The Journal of Clinical Hypertension*, 15, 806-814. <https://doi.org/10.1111/jch.12208>

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