

# Ethambutol is a Dialysable Drug, and Drug Monitoring Ensures Safety and Therapeuticity

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## 1. Introduction

- Ethambutol (ETB) is renally cleared, but clearance by contemporary haemodialysers is uncertain.
- There are no consensus guidelines on dosing ETB in the haemodialysis-dependent, despite the risk of toxicity (chiefly optic neuritis).

## 2. Clinical context

- 79-year-old Caucasian male on thrice-weekly 4-hourly haemodialysis, with disseminated BCGosis (Connaught strain, ImmuCyst®) following intravesical BCG for bladder cancer.
- Treatment: Rifampicin (RIF), isoniazid (INH) and ETB for 2 months, then RIF and INH for 4 months. All drugs were given post-dialysis.
- ETB MIC: 1000 µg/l (Ritz *et al.*, 2009).
- Target trough level <1000 µg/l; target peak level 2000-6000 µg/l (Ahitan *et al.*, 2011).

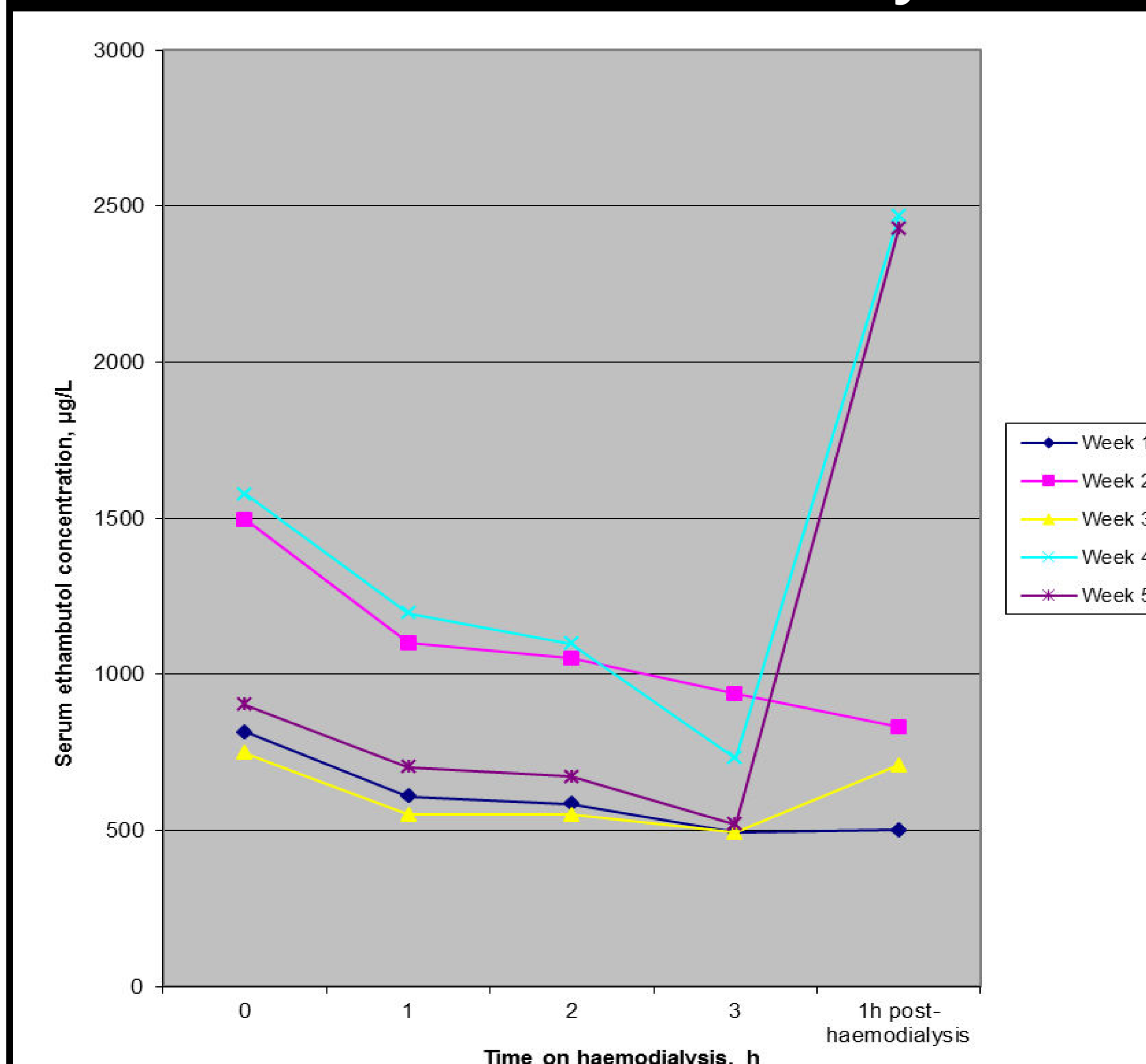
## 3. Methods

- Serum ETB levels were measured using HPLC at 0, 1, 2, and 3 h during dialysis, and 1 h post-dialysis, weekly for 5 weeks.
- A spot dialysate level was taken in week 2.
- Dialyser: Nipro ELISIO-19H high-flux, surface area 1.9 m<sup>2</sup>. Blood flow rate 300-350 ml/min.

## 4. Results

- A clear decline in ETB concentration during haemodialysis was observed (Fig. 1). Target levels were, in the main, achieved.
- The dialysate ETB concentration was significant at 274 µg/l (pre-dialysis level 1496 µg/l).
- Directly-observed therapy post-dialysis commenced in week 3, as the patient did not take ETB post-dialysis in weeks 1 and 2. Levels measured 1 h post-dialysis showed clear rises (Fig. 1).
- No abnormalities of colour vision were detected, and the patient had no visual symptoms.

**Figure 1. Serum ETB concentration vs. time on haemodialysis**



## 5. Discussion and Conclusion

- ETB is cleared with contemporary haemodialysers.
- The ETB peak levels likely exceeded the MIC ( $t_{max}$  for ETB is 2-4 h post-dose).
- Drug monitoring aids in maintaining therapeutic ETB concentrations and avoiding toxicity.
- Because ETB should be dosed after dialysis, directly-observed therapy ensures patient compliance.

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