Context Sensitive Half-Time

Anesthetic Pearls: Anesthetic Implications of Elimination Half-Time & Context Sensitive Half-Time

I. Elimination Half-Time

The elimination phase of the plasma concentration curve follows the initial distribution phase and is characterized by a more gradual decline in the drug's plasma concentration (Fig 1-2). This gradual decline reflects the drug's elimination from the circulation by renal and hepatic clearance mechanisms. The rate of drug elimination is defined by the slope of the line representing the log plasma concentration of drug plotted against the time during the elimination phase. The **elimination half-time** (**T½-β**) is the time necessary for the plasma concentration of a drug to decrease to 50% during the elimination phase. The elimination half-time of a drug is directly proportional to its volume of distribution (V_d) and inversely proportional to its clearance. The elimination half-time is independent of the dose of drug administered.

II. Context Sensitive Half-Time

The **context sensitive half-time** describes the time necessary for the plasma drug concentration to decrease by 50% after discontinuing a continuous drug infusion of a specific duration and the context refers to infusion duration (Fig 1-3). Context sensitive half-time considers the combined effects of distribution, metabolism, and duration of drug pharmacokinetics on continuous IV administered drugs. It bears **NO** constant relationship to the drug's elimination half-time (T½-β).

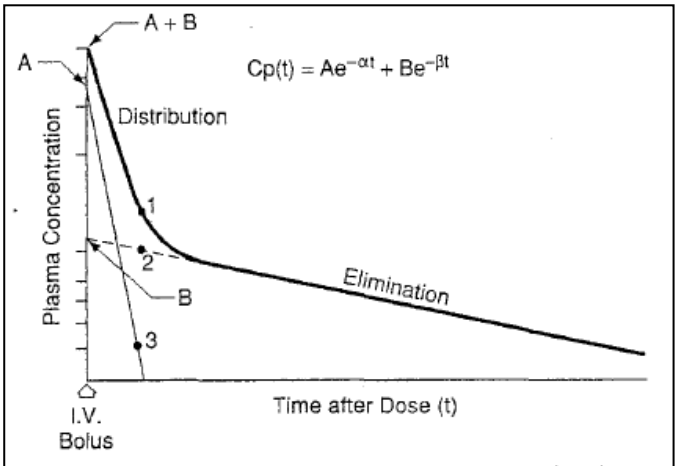

FIG. 1-2. Schematic depiction of the decrease in plasma concentration of a drug with time after rapid intravenous injection into the central compartment (see Fig. 1-1). Two distinct phases (biexponential) that characterize this curve are designated the distribution (alpha) and elimination (beta) phases. (From Stanski DR, Watkins WD. *Drug disposition in anesthesia.* New York: Grune & Stratton, 1982; with permission.)

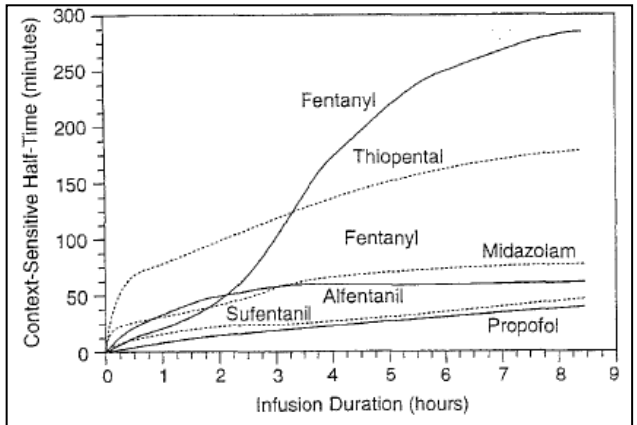

FIG. 1-3. Context-sensitive half-times as a function of the duration of intravenous drug infusion for each of the computer-simulated pharmacokinetic models. (From Hughes MA, Glass PSA, Jacobs JR. Context-sensitive half-time in multicompartment pharmacokinetic models for intravenous anesthetic drugs. *Anesthesiology* 1992;76:334–341; with permission.)