Comparative Hemodynamic Measurements
Including Tissue PO$_2$ Measurements on the Liver
under Vasopressin and Triglycyllysine Vasopressin

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Introduction

In 1979, our attention was drawn to the vasopressin derivative triglycyllysine vasopressin (TGLVP), which seemed to be well suited for the treatment of acute hemorrhage from esophageal piles. The drug Glycylpressin (Ferring Pharmaceuticals, Kiel) was introduced as a vasopressin derivative which has a selective effect on the visceral system lasting for more than several hours and without the side effects of vasopressin. Arguments against vasopressin treatment of acute esophageal pile hemorrhage included, first, cardiotoxic side effects, and, secondly, negative effects on the liver parenchyma, which is already damaged as a result of diminished arterial and venous perfusion. Korsback [3], for instance, reported an approximately 40% reduction of the partial oxygen pressure in the liver under intravenous vasopressin infusion: 37 mm Hg before vasopressin infusion and 20.5 mm Hg afterwards.

With the platinum multiwire surface electrode developed by Kessler and Lübbers [1, 2], a method has become available with which tissue PO$_2$ can be measured directly on the surface of the organ. The objective of our investigation was to control the partial oxygen pressure on the surface of the liver during lysine vasopressin application and under the administration of TGLVP.

Materials and Methods

Fourteen mongrel dogs (weight 18–23 kg) under high dosage pirtramide basic anesthesia and controlled ventilation with a FIO$_2$ of 0.21 were investigated. The surface of the liver was exposed by an approximately 15-cm-long upper abdominal laparotomy. With the multiwire surface electrode, the tissue PO$_2$ was registered continuously. Before, during, and after the administration of lysine vasopressin and TGLVP, PO$_2$ histograms were taken.
Results

Under lysine vasopressin (Fig. 1), the mean value in the histogram dropped from 19.5 to 11.5 mm Hg. There was a marked shift to the left of the histogram with a noticeable threefold increase in the values in the lowest class between 0 and 2.5 mm Hg. The hypoxic values and those close to hypoxia thus rose distinctly under lysine vasopressin, while the arterial PO_2 hardly changed.

Under the administration of TGLVP (25 μg per kg body wt.), there was only a slight shift to the left of the PO_2 histogram with a drop in the mean value from 20.0 to 17.5 mm Hg (Fig. 2). In particular, the number of values in the smallest class increased by only about 2%. These changes could barely be registered during the continuous recordings.

The hemodynamic reactions after vasopressin and TGLVP were almost identical, though their duration varied, since TGLVP has a prolonged effect. Even after an hour following TGLVP application, the hemodynamic changes were still pronounced, whereas 30 min after the infusion of lysine vasopressin almost initial values had returned.

In detail (Figs. 3, 4) it was found that:

- The arterial pressure increased by about 20%
- The peripheral resistance rose considerably
- There was hardly any change in pulmonary pressure
- The pulmonary resistance of the vessel increased slightly

![Fig. 1. Summarized PO_2 histograms before, during, and after lysine vasopressin infusion. Marked increase in hypoxic values and of those close to hypoxia in the middle PO_2 histogram during the infusion.](image-url)