Case Reports and Technical Note

Fatality from Ruptured Intracranial Aneurysm after Coating with Methyl 2-Cyanoacrylate (Eastman 910 Monomer, M2 C-1)

Case Report

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A recent fatality from a ruptured middle cerebral artery aneurysm which had been coated 3 days previously with methyl-2-cyanoacrylate disclosed findings at autopsy suggesting the possible importance of this single human case report.

Despite various warnings for several years that this material is toxic when applied to tissues such as blood vessels or nerves the belief persists that it is an inert biological adhesive suitable for the coating of intracranial aneurysms. Although complications and deaths have been reported,1 human autopsy verification of the arterial damage attributed to methyl-2-cyanoacrylate has been less clear.1,4

Case Report

J.W., No. 212071. A 64-year-old woman was admitted July 16, 1965, 1 day after a subarachnoid hemorrhage. She had probably had a similar episode 8 years previously with a transient left hemiplegia. She was slightly drowsy, but was oriented and responded when questioned (Botterell Grade II). She had a very slight left-sided weakness and left hyperreflexia with a left extensor plantar response. Lumbar puncture showed grossly bloody spinal fluid with a pressure of 370 mm. Daily lumbar punctures for 3 days, until her spinal fluid pressure was 130 mm., improved the headache. Right

Fig. 1. The aneurysm: X30. Arrows show the neck of the aneurysm. Top of figure shows the ruptured dome. Note the intact muscularis of the parent artery below the neck. Areas “A” and “B” are enlarged in Figs. 2 and 3.
FIG. 2. Area “A”: X75. Wall of the aneurysm near its neck. Note the necrosis and laminated wall with almost complete dissolution of cellular detail (between the arrows).

FIG. 3. Area “B”: X75. Necrotic wall of the aneurysm showing inflammatory cells, adhering particularly to external surface.

brachial and left carotid arteriography on July 17 revealed an aneurysm of the middle cerebral artery at its trifurcation.

Operation, July 20. The aneurysm was exposed without difficulty; the neck of the aneurysm was not suitable for clipping. Two drops of methyl-2-cyanoacrylate (M2 C-1) were applied in a thin coating over the entire aneurysm. No further procedure was carried out.

Course. The patient had a stormy postoperative course, never reacted well, and died on her 3rd postoperative day.

Autopsy revealed a massive hemorrhage in the Sylvian fissure; the aneurysm had bled again from its dome. Histological sections of the aneurysm (Figs. 1, 2 and 3) revealed a recent acute necrosis of the wall of the aneurysm with marked inflammatory reaction.

Comment

This finding led us to reappraise the effect of M2 C-1. Experiments on dogs revealed similar arterial necrosis when as little as one drop of the material was applied to the intracranial carotid artery (Fig. 4).2

Obviously the evidence does not prove conclusively that the adhesive caused the rupture. Nevertheless, we feel the warning is clear and should be brought to the attention of surgeons contemplating use of any form of methyl-2-cyanoacrylate in the treatment of intracranial aneurysms.

Summary

We have reported a human fatality due to a ruptured cerebral aneurysm following the use of a “clinical” preparation of methyl-2-cyanoacrylate. The arterial necrosis found at autopsy is similar to that found in the arteries of experimental animals treated with the same substance.

References