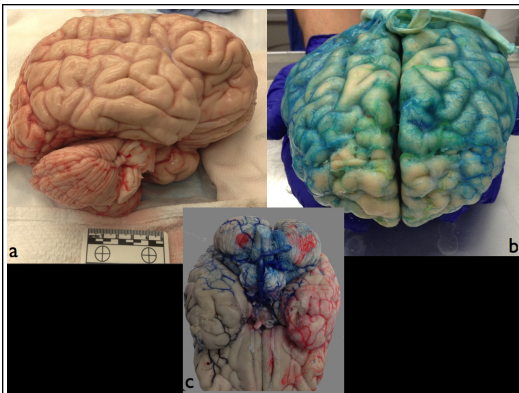


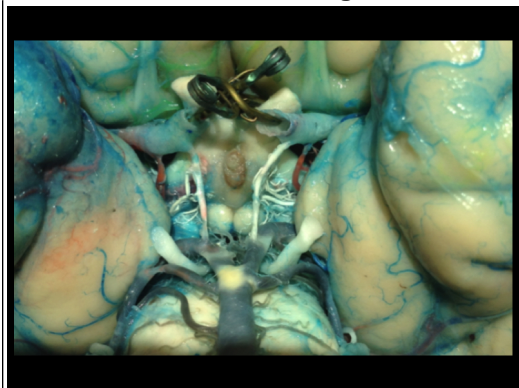
Introduction

Several studies have investigated the vasculature of each segment of the internal capsule whereas a few have addressed the variations. In this study the entire blood supply of the internal capsule was studied through microscopic evaluation of sections of brains that previously had received selective vascular dye injections.



a, pre-injection ; b,c, post-injection cadaveric brains

injection of cerebral arteries using individual colored gelatin



ACA: green, MCA: blue, PCA: black, PcomA: white, AchoA: red

Methods

This project involved study of deceased adult men and women without known neurologic histories. In each case, prior to brain removal, cerebral vessels were flushed with 3% saline. Following brain removal and fixation in 10% buffered formalin, cerebral vessels were isolated and cannulated for bilateral dye injections, using specific colors for each of the anterior, middle and posterior cerebral arteries, as well as the anterior choroidal and posterior cerebral arteries.

At least two days after dye injection, the cerebrum was cut in the horizontal plane at 0.5 cm thickness using an electric meat slicer. Tissue blocks including the entire internal capsule were selected for standard tissue processing, paraffin embedding and microtomy. Adjacent mirrored 10 micrometer slices were either stained with hematoxylin and eosin for structural evaluation or unstained to visualize the dye-filled vessels. Using a range of 4x to 20x magnifications, each vascular territory was then marked on the unstained slides based on observation of specific dyes. A spreadsheet algorithm was used to calculate the area for each vascular distribution.

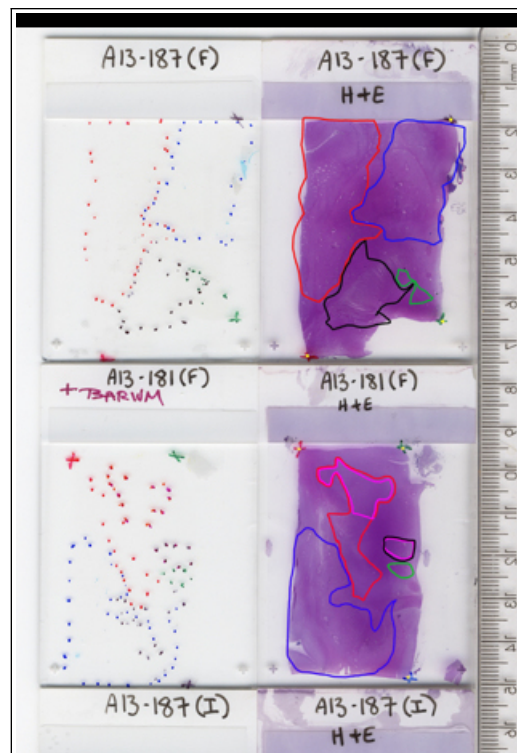
We also dissected the dye-injected arteries of the Circle of Willis from each brain, embedded the vessels into paraffin individually, and measured the interior vessel diameters under the microscope.

Results

The variability in vascular territorial distribution of the IC was successfully demonstrated in detail by this technique.

Learning Objectives

Utilize a novel technique to provide reliable data demonstrating arterial blood supply variations of the IC.



Left, 10 micrometer unstained sections of the internal capsule from the injected brains. Right, traced vascular distribution of individually injected cerebral vessels overlaid on H&E sections.

Conclusions

Arterial supply of the IC was found to be highly variable across individuals. This novel technique has provided very reliable preliminary data demonstrating this variability.

Embedded vessels



Cataloguing dissected vessels

