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Application of stereoscopic viewing to maximum intensity projection images obtained in MR angiography.

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of propofol was very low (1.9%). According to data previously reported in the literature (5, 6) in which propofol is reported to decrease arterial blood pressure markedly, our data revealed a tendency to cardiovascular instability in most patients mainly at the time of induction. However, drops of systolic arterial pressure were all transient, responded to temporary cessation of drug infusion, and did not cause any clinical sequela.

In conclusion, we believe that intravenous propofol is a good drug for anesthesia in pediatric patients undergoing MR. However, because of potential adverse side effects, we recommend careful selection of patients, continuous monitoring of vital signs, and constant supervision by an anesthesiologist or other trained person.

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References

1. Cockshott ID. Propofol (Diprivan) pharmacokinetics and metabolism: an overview. *Postgrad Med J* 1985;61(suppl):45
2. Puttick N, Rosen M. Propofol induction and maintenance in paediatric outpatients anaesthesia. *Anaesthesia* 1988;43:646–649
3. Bloomfield EL, Masaryk TJ, Caplin A, et al. Intravenous sedation for MR imaging of the brain and spine in children: pentobarbital versus propofol. *Radiology* 1993;186:93–98
4. Stephan H, Sunntag H, Schenk HD, Kohlhausen S. Effect of propofol on cerebral metabolism and on the response of the cerebral circulation. *Anaesthetist* 1987;36:60–65
5. Claeys MR, Gepts E, Camu F. Haemodynamic changes during anaesthesia induced and maintained with propofol. *Br J Anaest* 1988;60:3–9
6. Short SM, Aun CST. Haemodynamics effects of propofol in children. *Anaesthesia* 1991;46:783–785

Application of Stereoscopic Viewing to Maximum Intensity Projection Images Obtained in MR Angiography

The application of an old radiographic technique, stereoscopic viewing (1, 2), to either spiral computed tomographic angiography or magnetic resonance angiography maximum intensity projection algorithm images is easily accomplished and can significantly enhance both diagnostic detection and evaluation of lesions.

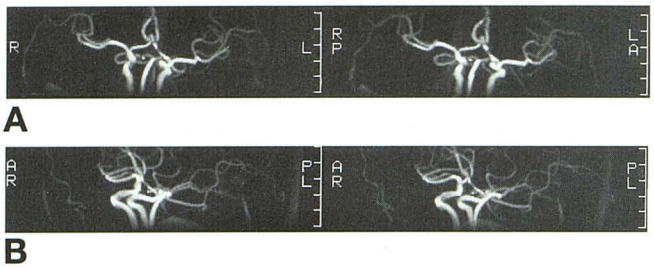

Fig 4. *A* and *B*, Maximum intensity projection image pairs of a three-dimensional phase-contrast (36/8 [repetition time/echo time], 15° flip angle, velocity encoding 40 cm/s) magnetic resonance angiogram are easily seen in three dimensions stereoscopically either by crossing ones eyes or by using a hand-held stereoscopic viewer. Note how well anterior communicating artery aneurysm and its relationship to surrounding vessels is evaluated in three-dimensional viewing.

Stereoscopic viewing permits the judging of relative distances between structures and parts of the same structure and thus helps not only in locating a lesion but also in perceiving its shape, structure, and spatial relationships (3).

We have noted that our magnetic resonance scanner (GE 1.5 T) displays magnetic resonance angiography maximum intensity projection images in such a way, 20 images rotated 18° around a 360° axis, that every image pair is easily visualized stereoscopically. The additional information obtained may obviate the need to perform standard invasive angiography in some patients and add to the information obtained in these studies. Overlapping vessels can be clearly separated.

In the case shown—an incidental clinically silent anterior communicating artery aneurysm—stereoscopic viewing of multiple images as well as evaluation of magnetic resonance angiography source images and standard spin-echo coronal, axial, and sagittal images make standard invasive angiography unnecessary (Fig 4).

Stereoscopic viewing of chest radiographs, facial x-rays, arch arteriograms, and other radiographic studies has fallen into disuse in recent decades. However, with practice, these skills can be learned and should be applied to the optimal evaluation of maximum intensity projection magnetic resonance angiography and computed tomographic angiography images.

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References

1. The stereoscopic x-ray examination of the chest with special reference to the diagnosis of pulmonary tuberculosis. *Bull Johns Hopkins Hospital* 1911;22:229
2. Batsonov, Carpentier VE. Stereoscopic depth perception. *AJR Am J Roentgenol* 1944;51:202
3. Selman J. *The Fundamental of X-ray and Radium Physics.* 7th ed. Springfield, Ill: Charles C Thomas

Fluid-Blood Levels in Intracerebral Hemorrhage

The paper from Pfleger et al in the February issue of the *AJNR* (1) concludes that fluid-blood levels in acute intracerebral hemorrhage are moderately sensitive to the presence of coagulopathy and highly specific for this condition. I do agree with this conclusion drawn from the data shown in their series and the critical review of the literature consulted by the authors. However, I would like to mention that in the authors' review of the literature, an earlier paper published on this subject is omitted (2).

Pfleger et al subdivided a data pool of 217 patients with intracerebral hemorrhages in two groups: group I (185) was formed by cases *without* a coagulopathy, and group II included 32 patients *with* known coagulopathy or abnormal prothrombin or thromboplastin time. In our work (2) we also compared two groups, but the criteria were quite different. Although we reviewed 174 cases of intracerebral hemorrhage, clinical or analytic data concerning risk for coagulopathy was available in only 54 patients. Therefore group I was formed by the 7 cases *with fluid-blood level* (we called it "level hematomas" because we considered the upper part as the plasma component of the blood), and group II was formed, as a control group, by 54 cases *without level.*

After our findings it was evident that clinical or analytic data suggesting a coagulopathy were present in all the patients with level hemorrhages, but 48% of the control group also had a known coagulopathy, abnormal analytic data, risk factors, or more than one of these conditions. We concluded that a coagulopathy was insufficient by itself to explain the level pattern in all the cases, although it should instead have been stated that a preexisting coagulopathy will not necessarily result in a fluid-level hematoma. In other words, as Pfleger et al concluded, a fluid-level pattern strongly suggests a coagulopathy, whereas the finding of a fluid-level in patients with abnormal prothrombin or thromboplastin time is much less probable.

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References

1. Pfleger MJ, Hardee EP, Contant CF, Jr, Hayman AL. Sensitivity and specificity of fluid-blood levels for coagulopathy in acute intracerebral hematomas. *AJNR Am J Neuroradiol* 1994;15:217–223
2. Pons LC, Perez J, Torrent O, Espinet H. CT Pattern of spontaneous intracerebral hematomas with failure of clot formation. *Choices and Characteristics in CT.* Amsterdam: Kugler Publications; 1980:161–166

Reply

We appreciate receiving Dr Pons's information concerning his series of intracerebral hematomas. We were happy to learn that our data and conclusions were in agreement. I regret that our literature search did not uncover his report. However, we relied on the *Index Medicus,* which currently contains listings from 3081 journals, and it does not list reference 2 referred to in Dr Pons's letter.

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