Lateral Pontine Hemorrhage: Reappraisal of Benign Cases

Oscar H. Del-Brutto, MD, Carlos A. Noboa, MD, and Fernando Barinagarrementeria, MD

We reviewed 6 computed tomography-documented cases of primary lateral pontine hemorrhage that occurred in our two institutions over a 2-year period. All patients survived the acute stroke, with excellent functional recovery in 4. The level of consciousness of the patient and the size of the hemorrhage had no consistent bearing on outcome. Both of these features have been considered important prognostic indicators in patients with pontine hemorrhage, but in our series benign outcomes were not restricted only to patients who were alert or had small hemorrhages; on the other hand, severe disability was noticed in 1 patient with a small hematoma strategically located in the pontine tegmentum. Our observations suggest that, although some patients with lateral pontine hemorrhage have a good prognosis, there is no single determinant that predicts outcome in a given patient. (Stroke 1987;18:954-956)

The classic syndrome of pontine hemorrhage includes coma, respiratory abnormalities, pinpoint pupils, loss of horizontal eye movements, quadriplegia, and bilateral corticospinal tract dysfunction.\(^1-2\) Ocular bobbing\(^4\) and hyperthermia may also be present. Most patients die within the first 24 hours after the acute event.\(^1\) At necropsy, the hematoma usually involves the entire pons with extension into the midbrain and the fourth ventricle.\(^2\)

In recent years, several cases of pontine bleeding with favorable outcome and unexpected clinical manifestations have been reported.\(^5-20\) Widespread use of computed tomography (CT) has led to better recognition of such relatively benign cases.\(^21\) In most of these patients the hematoma was small and confined to one side of the pons.\(^5-8,10-14,18-20\) Such reports have changed previous concepts about invariance of the lethal outcome of pontine hemorrhage and have prompted many authors to recognize features that are common to the benign cases.\(^5-8\) In this paper, we report 6 cases of lateral pontine hemorrhage to further outline the clinical features, CT findings, and outcome of these lesions.

Subjects and Methods

We reviewed all CT-documented cases of lateral pontine hemorrhage that occurred in our institutions over a 2-year period. After exclusion of bleeding associated with arteriovenous malformations, tumors, or trauma, we found 6 cases of primary hemorrhage that represent the material for this study. Special emphasis was placed on the level of consciousness at admission and on CT findings to further correlate both features with the outcome in every patient (Table 1).

Results

Four patients were women, 2 men. Ages ranged from 38 to 76 years, with a median of 51 years. Arterial hypertension was present in 4 patients. One patient was taking oral amphetamines for obesity. Onset was abrupt in 5 patients; gradual progression over a 48-hour interval was seen in 1 patient. Headache and alteration in consciousness appeared as prominent symptoms. On admission, 3 patients were in a coma, 1 was somnolent, and 2 were alert. Two of the 3 patients initially in a coma regained full consciousness 72 and 96 hours later. Frequent neurologic signs were ocular paresis, small reactive pupils, dysarthria, hemiplegia, and limb ataxia. CT scans showed lateral hematomas in all cases. In all but 2 patients, the hemorrhage involved the basal and tegmental pons. Rostral extension was documented in 2 cases. In 2 patients, the hemorrhage invaded the fourth ventricle with obstruction and secondary hydrocephalus. All patients survived the acute stroke. One patient died of aspiration pneumonia while recovering from the stroke, 4 patients showed almost complete recovery with minor motor sequelae, and the last patient was severely incapacitated 1 month after the stroke.

Discussion

Lateral pontine hemorrhage was recognized before the availability of CT\(^1,2,22\); however, it was considered rare.\(^5\) Using CT, it is clear that the incidence of lateral pontine hemorrhage is greater than previously appreciated and the clinical signs more varied.\(^6-20\) Two clinical syndromes of hemorrhage confined to one side of the pons have been described.\(^6,22\) In one, the hematoma involves both the basis pontis and tegmentum and is associated with crossed hemiparesis and ipsilateral brainstem signs. In the other, the hematoma is confined to the tegmentum and is associated with ipsilateral brainstem signs. The clinical picture in every patient of our series was consistent with one of these
Table 1. Level of Consciousness, Computed Tomography Findings, and Outcome in 6 Patients with Lateral Pontine Hemorrhage

<table>
<thead>
<tr>
<th>Case/sex/age</th>
<th>Level of consciousness</th>
<th>Computed tomography</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/F/76</td>
<td>Sudden coma; alert 96 hours later</td>
<td>Right pontine hemorrhage with blood in fourth ventricle; hydrocephalus</td>
<td>Excellent</td>
</tr>
<tr>
<td>2/F/43</td>
<td>Somnolence</td>
<td>Left pontine hemorrhage with rostral extension into midbrain</td>
<td>Excellent</td>
</tr>
<tr>
<td>3/F/38</td>
<td>Sudden coma; stupor few hours later</td>
<td>Small hemorrhage in right pontine tegmentum; blood in fourth ventricle; hydrocephalus</td>
<td>Bedridden</td>
</tr>
<tr>
<td>4/F/39</td>
<td>Alert</td>
<td>Small hemorrhage in right side of pons</td>
<td>Excellent</td>
</tr>
<tr>
<td>5/M/48</td>
<td>Sudden coma; alert 72 hours later</td>
<td>Left pontine, midbrain hemorrhage</td>
<td>Died of aspiration pneumonia</td>
</tr>
<tr>
<td>6/M/62</td>
<td>Alert</td>
<td>Right pontine hemorrhage</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

Pontine syndromes, and CT findings correlated closely with the neurologic manifestations. Previous reports stress the presence of arterial hypertension in 60–90% of the cases. In the present cases, 4 of 6 patients were hypertensive. It is important to note oral amphetamine ingestion in 1 patient. The association between intracerebral hemorrhage and the use of oral or intravenous amphetamines has been noted, but to our knowledge this is the first case of pontine hemorrhage secondary to amphetamine abuse.

Another important feature of patients with lateral pontine hemorrhage is their good prognosis. In most series, a benign outcome was noted when consciousness was not severely impaired at admission. The transverse diameter of the hematoma has also been considered a prognostic factor. Masiyama et al found a direct relation between the maximum transverse diameter of the hematoma seen in CT scans and the outcome. In their series, a diameter of < 20 mm was associated with favorable outcome.

While the level of consciousness at admission and the transverse diameter of the hematoma predicted the outcome of patients with pontine hemorrhage in some instances, we found exceptions to both as indicators. There was spontaneous recovery in 2 of the patients in coma at onset and severe disability in the patient with the smallest hemorrhage of our series (Figure 1). We could not find any single determinant that predicts a good prognosis in every patient with lateral pontine hemorrhage.

Systemic complications can be a major cause of morbidity and mortality in patients who survive the acute hemorrhage. Nakajima found a 15% incidence of gastrointestinal bleeding in patients who survived > 8 days after the stroke. Other common disturbances in his series were neurogenic bladder and autonomic dysfunction. Caplan and Goodwin reported a high mortality rate (44%) from causes not related to the pontine hemorrhage. In our series, only 1 patient died from systemic complications while recovering from the stroke.

Treatment of patients with lateral pontine hemorrhage should be conservative. Although there have been isolated reports of successful removal of pontine hematomas, several other studies have documented that medical management has been sufficient to permit recovery in similar cases. With the present knowledge, there is no place for surgery in the management of lateral pontine hemorrhage with the exception of shunting patients with persistent hydrocephalus.

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References

**KEY WORDS** • pontine hemorrhage • posterior fossa hemorrhage • lateral brainstem hemorrhage • brainstem syndromes
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