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Surgery's Role In Spontaneous Intracerebral Hematoma Management

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ABSTRACT:

Spontaneous Intracerebral Hematomas account for 10% of strokes, with a peak frequency around 60. High blood pressure is the primary cause. Literature shows poor prognostic factors and effective surgery for these hematomas.

The study reveals 13 Spontaneous Intracerebral Hematoma cases, operated at Mustapha Pacha University Hospital (2019–2023) and ALI AIT IDIR Hospital Health Establishment (2016–2019). High blood pressure is the primary cause, but hematomas complicating head trauma, brain tumors, or vascular malformations are excluded from the study. The average age of the patients was 63 years, with 9 men (69,23%%), and 4 women (30,76 %). Arterial hypertension was the major cause, regardless of the hematoma's location. Amyloid angiopathy is common at the age of 65. There is no obvious etiology, despite advances in diagnostic possibilities. Clinical symptomatology may present with two modes of onset: brutal (62.5%) and progressive (37%). A primarily cortical location is rare in hypertensive patients, and they must systematically look for a vascular cause with imaging. The series focuses on surgical treatment for lobar hematomas and central ganglia, with a mortality rate of 62.5%. Patients were operated on late and in a comatose state, with a 30-day mortality rate ranging from 35 to 52%. Neurosurgery involves regulating blood pressure, stopping anticoagulant medication, and determining the necessity of surgery. Surgery, including conventional craniotomy, minimally invasive surgery, and decompressive craniectomy, has a contentious role in treating supratentorial hemorrhagic stroke.

Key words: *hemorrhagic stroke, Spontaneous Intracerebral Hematomas, surgery*

INTRODUCTION:

Spontaneous intracerebral hematoma represents 10% of strokes. The peak frequency is around the age of 60 (male predominance). High blood pressure remains the essential cause of basal ganglia hemorrhages **(Sacco R.L., 2013)**. Excluded from this study are hematomas complicating head trauma, brain tumors, or vascular (arteriovenous) malformations. Numerous works in the literature devoted to the analytical study of the prognosis of spontaneous intracerebral hematoma have already made it possible to identify the main factors of poor prognosis where surgery seems to be effective **(Hemphil J.C. et al., 2015).**

MATERIAL AND METHODS :

This study excludes post-traumatic hematoma, which occurs in young patients after accidents, brain tumors, or vascular malformations. Spontaneous hematoma, which occurs after age fifty, and arterial hypertension are the main causes of basal ganglia hemorrhages. Previous studies have identified factors contributing to poor prognosis and where surgery is effective. The study presents patients operated at neurosurgery departments of ALI AIT IDIR Hospital Health Establishment (2016–2019) and Mustapha Pacha University Hospital (2019–2023),who underwent brain CT scans

RESULTS:

The study of 13 cases, with an average age of 63 (range 58–69 years), found arterial hypertension as the primary cause, regardless of the hematoma's location ***(Table 01)***. We have 9 men (69,23%), and 4 women (30,76 %). Amyloid angiopathy is common in patients over the age of the age of 65. Despite advances in diagnostics, no clear etiology is known. Clinical symptoms may be brutal or progressive, with a vascular cause being systematically identified through imaging.Brutal in 05 cases (62.5%) and progressive in 03 cases (37%) ***(Table 02).*** Hypertensive patients often have a mainly cortical location.

Table 01: Etiologies of Spontaneous Intracerebral Hematoma and literature review.

	Our series	
Arterial hypertension	**03 cas**	**62.5%**
Taking anticoagulants	**01 cas**	**12.5**
Diabetes	**01 cas**	**12.5**
No etiology	**01 cas**	**12.5**
Arteriovenous malformation	**02 cas**	**25**

	Literature		
	Pertuiset (96)	**Senant (140)**	**LUICH(110)**
Arterial hypertension	**57%**	**54%**	**68%**
Anticoagulant TRT	**14%**	**13%**	**5%**
Arteriovenous malformation	**-**	**-**	**4%**
Tumor	**-**	**-**	**4%**
Without reason	**29%**	**33%**	**4%**

Table 02: Clinical signs of Spontaneous Intracerebral Hematoma and literature review

	Our series	
Headache	**03 cases**	**(37.5%)**
Epileptic seizure	**01 case**	**(12,5%)**
Motor deficit	**02 cases**	**(25%)**
Disorder of consciousness	**02 cases**	**(25%)**

	Literature		
	TANAKA (32)	**KASE(22)**	**IWASAKI(18)**
Headache	**69%**	**68%**	**77%**
Vomiting	**-**	**45%**	**67%**
Epilepsy	**9%**	**23%**	
Hemiparesis	**-**		**39%**
Hemianopia	**-**		**11%**
Hemianesthesia	**-**	**18%**	**-**
Coma	**-**	**31%**	**-**
Obsession	**-**	**40%**	**-**
Normal alertness	**-**	**31%**	

In our series, we have five lobar locations and three deep locations of the hematoma ***(Table 03)***. Surgical treatment for lobar hematomas and central ganglia: The series reported a mortality rate of 62.5%, with 05 cases (62.5%) being late-operated and in a severe comatose state after 5 days ***(Table 04)***.

. The 30-day mortality rate ranges from 35 to 52% ***(Table 04)***. The field of neurosurgery involves certain unique considerations. Three clinical issues come up while treating these patients: regulating blood pressure, stopping any anticoagulant medication, and figuring out whether surgery is necessary. Surgery (conventional craniotomy, minimally invasive surgery, and decompressive craniectomy) has a contentious function in treating supratentorial hemorrhagic stroke.

Table 03: Spontaneous Intracerebral Hematoma's Locations and literature review

Our series

Lobar locations	Deep locations
Frontal: 01 case .	Internal thalamo-capsular: 02 cases
Temporal: 01 case .	External capsular: 01 cases
Occipital: 01case.	
Cerebellar: 02 cases.	

Literature

Lobar locations	Deep locations
Frontal: 08 cases	Thalamic: 22 cases
Temporal: 18 cases	Lenticular: 47 cases.
Occipital: 07cases	
Ventricular crossroads: 15 cases	

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Table 4: The score of ICH and the mortality rate at the end of the first month

Score of ICH	Mortality at 01 month
5 or 6	**100 ٪**
4	**97 ٪**
3	**72 ٪**
2	**26 ٪**
1	**13 ٪**
0	**0 ٪**

Table 05: Spontaneous Intracerebral Hematoma's Mortality and literature review

AUER 1989	Mortality	Functional outcomes
Spontaneous Intracerebral Hematoma operated (100)	**30%**	**40%**
Spontaneous Intracerebral Hematoma not operated	**70%**	**25%**

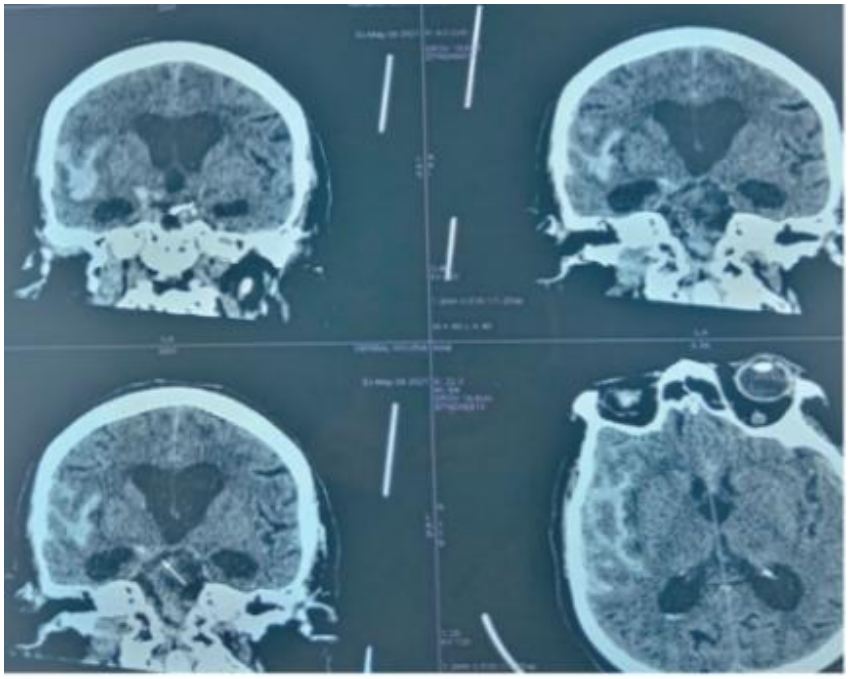

Figure 1: Subarachnoid hemorrhage

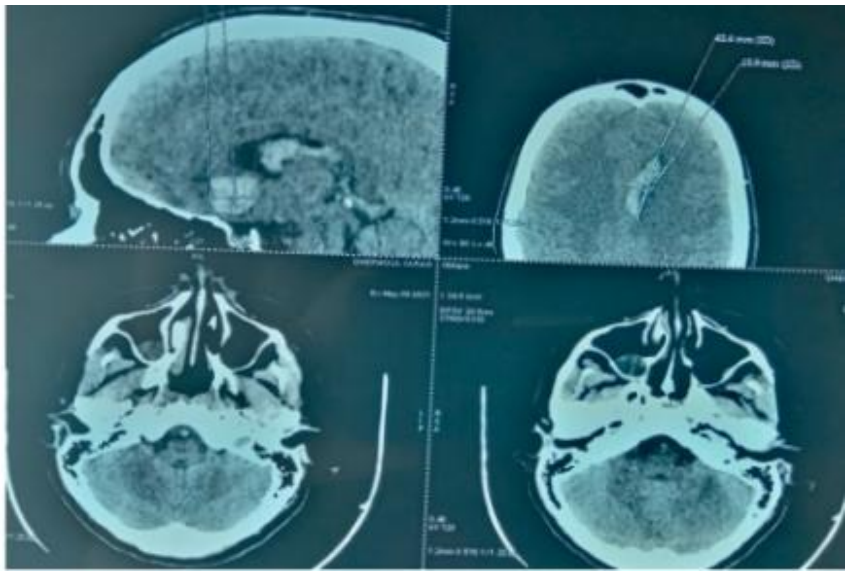

Figure 2: Patient Presenting Spontaneous Intracerebral Hematoma with Ventricular Flooding

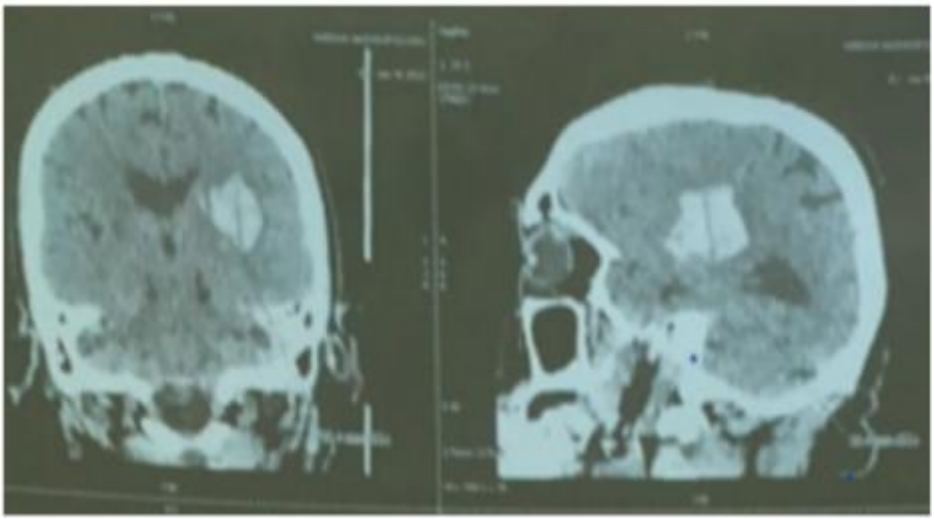

Figure 3: Spontaneous Intracerebral Hematoma of a Patient on Anticoagulants (Thalamus)

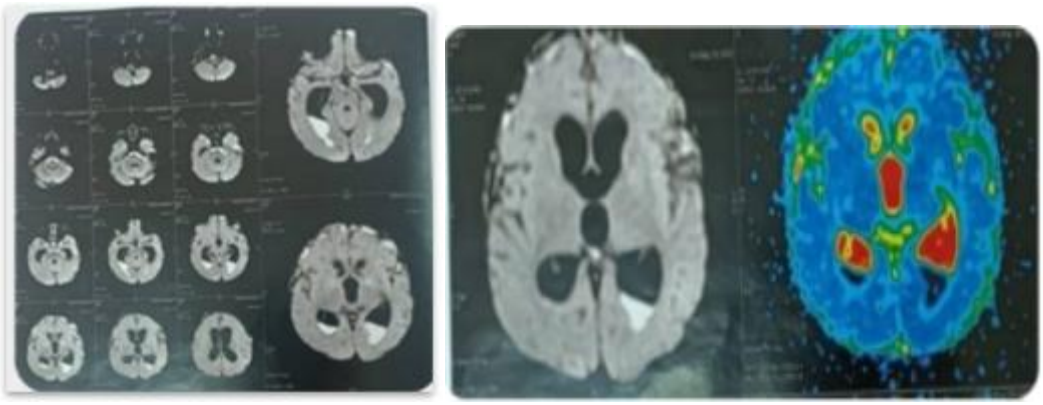

Figure 4: NMR Angio of Spontaneous Intracerebral Hematoma

DISCUSSION:

Regardless of where the hematoma is located, arterial hypertension is the primary cause. The presence of anticoagulant treatment increases the risk of hemorrhage by 10 **(Wintzenar 1984; Moussa and Risk 2008).** Amyloid angiopathy is common at the age of 65 and often unknown because it is impossible to prove in the absence of histological control eight cases reported by **Capron and Rachdi 2019**. It constitutes the second cause of primary cerebral hemorrhages and is responsible for recurrent Spontaneous Intracerebral Hematoma outside of any hypertension. Despite improvements in diagnostic abilities, there is no apparent cause. Clinical symptomatology may present with a mode of onset. Brutal: 05 cases, 62.5%; progressive: 03 cases (37%). The onset of clinical symptoms is rapid in 2/3 of cases in a few minutes **(Hungerbuhler 1982; Lewington S. 2002).**

The following factors are helpful for the diagnosis and treatment selection of hematomas: the extent of bleeding, the mass effect, and the presence of ventricular flooding **(Hamon M., 2005)**. Enlarged ventricles result in hydrocephalus. The generalization of the CT examination in the face of any discreet or transient neurological deficit reveals, contrary to old data in the literature, a discreet predominance of lobar hematomas and the increase in the number of frequency of small hematomas diagnosed ***(Figure 1, 2 and 3).***

Cerebral Angiography is used when a case of H.I.S. is not clearly a hypertensive case, to avoid overlooking aneurysms, arteriovenous malformations, cavernomas, meningioma, or glioma that may require surgery. Angio MR FLAIR sequences show hyper signals within the s/arachnoid spaces, with a "spot sign" in the hematoma, which is a predictive factor for expansion ***(Figure 4).***

According to the AUER 1989 report, in 30–40% of cases, spontaneous cerebral hematomas were operated upon, while in 75–25% of cases, they were not ***(Table 5).***

The best surgical results on a vital and functional level are obtained in lobar hematomas. Many neurosurgeons only intervene secondarily when faced with deterioration. Early surgical intervention, preferably before 7 a.m. In the case of spontaneous intracerebral hematoma of the cerebellum, there are two cases in our series. Healing was obtained with moderate sequelae of hemi-cerebellar syndrome. Mortality represents 31% compared to 54% in the absence of surgical intervention **(Grillo P., 2006).** On the other hand, Spontaneous

Intracerebral Hematoma of the brain stem: fatal when they are voluminous, favorable development when exceptional.

Surgical intervention for Spontaneous Intracerebral Hematoma is controversial, with randomized trials reporting a long period of intervention ranging from 4 to 96 hours after symptom onset. The **STICH** study suggests better outcomes for patients operated before 9 p.m., and a meta-analysis of 2,186 patients found that surgery improved outcomes within 8 hours of hemorrhage. However, the place of surgery in treating hemorrhagic stroke remains poorly codified, with only one study examining its benefits.

The **STICH** study compared the outcome at 6 months of a group of patients receiving early surgery before the 72nd hour to a group of patients receiving conservative medical treatment **(Broderick J., 2007).** The results do not find any advantage to early surgery except for one category of patients (lobar hematoma less than 1 cm with a low deficit and a GCS greater than 9. However, this single study does not confirm the absence of surgical indications in cerebral hematomas. The study immediately excluded the most serious patients and/or patients requiring urgent surgical treatment. The American recommendations thus recognize as surgical indications hematomas larger than 3 cm, patients with neurological deterioration, or Spontaneous Intracerebral Hematoma,, or hydrocephalus **(Mendelow A.D., 2005)**. Decompressive craniectomy is also very poorly evaluated. No study has demonstrated an improvement in survival. However, it can be considered on a case-by-case basis in cases of refractory Spontaneous Intracerebral Hematoma,, and it seems that it must be performed early before signs of cerebral involvement. Minimally invasive surgery is currently being evaluated and remains exceptional.

According to **Ashkan Shoamanesh (2020),** surgical management of Spontaneous Intraventricular Hemorrhage involves considering external ventricular drainage (EVD) for patients with reduced consciousness and hydrocephalus due to intraventricular hemorrhage or mass effect. Surgical evacuation is not recommended for stable symptoms or no signs of hernia. Intraventricular thrombolysis is generally not recommended for SICH. Short-term surgical intervention may be considered for patients with surgically accessible supratentorial hemorrhages and clinical signs of herniation, particularly if they belong to subgroups such as

young patients, superficial HI, cortical, or vascular or neoplastic lesions. A neurosurgical consultation may be considered for cerebellar hemorrhage if there is altered consciousness, new brainstem symptoms, or a diameter of 3 cm or more. The placement of an external ventricular drain must be done in conjunction with the evacuation of hematomas in the context of concomitant hydrocephalus. The clinical benefit of minimally invasive clot evacuation remains to be established. Routine use of stereotactic thrombolysis and drainage is not recommended.

CONCLUSION:

Hemorrhagic strokes are life-threatening emergencies with high mortality rates, ranging from 30 to 40%. The first hours are crucial for survival, and appropriate care improves the quality of life. Collaboration between emergency physicians, neurologists, resuscitators, and neurosurgeons is necessary to optimize treatments and care pathways. Strict blood pressure control is preferred in the first hours. Surgical indications remain unclear, but a multifactorial prognosis score study has shown that surgery can improve outcomes for patients with low survival chances. Further research is needed to confirm these findings.

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