# Traumatic vein of Labbe hemorrhagic infarction clinical profile and outcome analysis

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## Abstract

**Background:** Of the various neurosurgical entities, traumatic vein of Labbe hemorrhagic infarction is unique and requires exceptional care as it drains into the eloquent area and shows higher affinity for early uncal herniation.

Objective: To study the clinical profile and outcome analysis of traumatic vein of Labbe hemorrhagic infarction.

**Materials and Methods:** We analyzed 26 cases admitted in our department between 2012 and 2015 and studied the clinical profile and carried out an outcome analysis of the same.

**Result:** The presence of associated injuries was seen in 77% of cases and contracoup injury in 31% of them. Most of the patients were managed conservatively (57%). Surgical intervention was required in 43% of cases, with overall mortality of 12%. Hemiparesis and opercular syndrome were the most common deficits seen in the patients (11%).

**Conclusion:** Traumatic vein of Labbe hemorrhagic infarction in an important neurosurgical emergency. Maintaining a high index of suspicion and following-up of patients showing hyperdensity in the transverse sinus region is, thus, imperative. Cerebral venous thrombosis that is left untreated might result in hemorrhagic infarction and death.

KEY WORDS: Trauma, vein of Labbe, outcome

# Introduction

Dural venous sinus thrombosis (DVST) after blunt head trauma has been reported in a few case series.<sup>[1-6]</sup> Limited studies have been carried out on the outcomes that occur after traumatic vein of Labbe hemorrhagic infarction.<sup>[7]</sup> It is an important neurosurgical entity because of the eloquent territory it drains, higher affinity for causing early uncal herniation, and sometimes fatal outcome.<sup>[8–10]</sup> So, a strict observation of the patients and, if required, early surgical evacuation are the significant factors in the management of the same. This condition is identified by the differential diagnosis of the traumatic temporal artery damage where the damage to the medial temporal

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region including the insular territory is also observed. Another entity to be excluded is the transverse sinus thrombosis.

# **Materials and Methods**

We included 26 cases admitted in the Department of Neurosurgery with the diagnosis of traumatic vein of Labbe hemorrhagic infarction from January 2013 to 2015. All patients with traumatic temporal lobe lesions were included in the study. The demographic data of patients, initial Glasgow coma scale (GCS) sore, associated findings, and other systemic injuries were also included. Patients presenting with low GCS and anisocoria and computed tomography (CT) image showing significant lesions with evidence of uncal herniation [Figure 1] were immediately taken up for surgical evacuation [Figure 2]. Patients with traumatic transverse sinus thrombosis were evaluated for possible evolution in the hemorrhagic infarction. Glasgow outcome score (GOS) of the patients at discharge were recorded. Magnetic resonance (MR) venography [Figure 3] was advised in all the cases, especially in those managed conservatively to confirm the diagnosis. Informed consent was taken in all the cases, and the clearance for the

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Figure 1: CT image showing significant lesion with evidence of uncal herniation.



Figure 2: Post operative CT image of the patient during his follow up.



Figure 3: MR venography showing absence of vein of labbe on the right side.



Figure 4: Male:female ratio (in %).

study was taken from the hospital ethical clearance committee. The analysis of the study was formulated using the SPSS software, version 20.

## Result

The male:female ratio was 7.66:1 [Figure 4]. The age range of the patients was from 5 to 78 years.



Figure 5: GOS at three months (in %).

Table 1: Outcome analysis of the cases

GCS         Mild         12         46           Moderate         6         23           Severe         8         31           Sex          3         12           Male         23         88           Female         3         12           Site          1         23           Left         15         58           Right         10         38           Bilateral         1         4           Contracoup injury         Yes         8         31           No         18         69           Associated injury         Yes         20         77           No         6         23         34           Drakes         2         9         34           Drakes         2         9         GOS         5           5         6         23         1         42           3         6         23         1         42           3         6         23         1         1         42           3         6         23         1         1         42         3         11	Parameters	Frequency	%
Mild       12       46         Moderate       6       23         Severe       8       31         Sex       8       31         Male       23       88         Female       3       12         Site       12       58         Left       15       58         Right       10       38         Bilateral       1       4         Contracoup injury       7       4         Yes       8       31         No       18       69         Associated injury       7       4         Yes       20       77         No       6       23         Management       2       9         GOS       2       9         GOS       5       6       23         4       11       42       3         3       11       42       3         4       11       42       3         3       13       14       14         3       14       3       15         Nil       17       65       16         Hemiparesis <td>GCS</td> <td></td> <td></td>	GCS		
Moderate         6         23           Severe         8         31           Sex          88           Female         3         12           Site          12           Left         15         58           Right         10         38           Bilateral         1         4           Contracoup injury         8         31           Yes         8         31           No         18         69           Associated injury         7         7           Yes         20         77           No         6         23           Management         7         7           Conservative         15         57           Craniotomy         9         34           Drakes         2         9           GOS         5         6         23           1         3         12           Neurological deficits         11         42           3         12         11           Neil         17         65           Hemiparesis         3         11           Opercular	Mild	12	46
Severe         8         31           Sex         Male         23         88           Female         3         12           Site         12         12           Left         15         58           Right         10         38           Bilateral         1         4           Contracoup injury         Yes         8         31           No         18         69           Associated injury         77         No         6         23           Management         77         No         6         23           Management         2         9         34           Conservative         15         57         57           Craniotomy         9         34         34           Drakes         2         9         34           GOS         -         23         1           4         11         42         3         12           Neurological deficits         -         -         3         11           Nil         17         65         -         -         -           Neurological deficits         -         -	Moderate	6	23
Sex         Male         23         88           Female         3         12           Site         12           Left         15         58           Right         10         38           Bilateral         1         4           Contracoup injury         Yes         8         31           No         18         69           Associated injury         77         No         6         23           Management         77         No         6         23           Management         2         9         34           Conservative         15         57         57           Craniotomy         9         34         34           Drakes         2         9         34           GOS         -         23         1         42           3         6         23         1         2           Muiniony         3         12         12         14         12           Neurological deficits         -         -         15         14           Maimum         17         65         14         15           Hemiparesis	Severe	8	31
Male         23         88           Female         3         12           Site	Sex		
Female         3         12           Site         Left         15         58           Right         10         38           Bilateral         1         4           Contracoup injury         Yes         8         31           No         18         69           Associated injury         Yes         20         77           No         6         23           Management         Conservative         15         57           Craniotomy         9         34           Drakes         2         9           GOS         5         6         23           1         3         12         Neurological deficits           Nil         17         65         14           3         6         23         11           Dercular syndrome         3         11         12           Neurological deficits         Nil         17         65           Hemiparesis         3         11         12           Opercular syndrome         3         11         12           Maximum         52         Age (years)         Minimum         5           M	Male	23	88
Site         Left         15         58           Right         10         38           Bilateral         1         4           Contracoup injury         *         *           Yes         8         31           No         18         69           Associated injury         *         *           Yes         20         77           No         6         23           Management         *         *           Conservative         15         57           Craniotomy         9         34           Drakes         2         9           GOS         *         *           5         6         23           4         11         42           3         12         *           Neurological deficits         *         *           Nil         17         65           Hemiparesis         3         11           Opercular syndrome         3         11           Length of stay (days)         *         *           Minimum         2         *           Age (years)         *         *	Female	3	12
Left         15         58           Right         10         38           Bilateral         1         4           Contracoup injury         *         *           Yes         8         31           No         18         69           Associated injury         *         *           Yes         20         77           No         6         23           Management         *         *           Conservative         15         57           Craniotomy         9         34           Drakes         2         9           GOS         *         *           5         6         23           4         11         42           3         12         *           Neurological deficits         *         *           Nil         17         65           Hemiparesis         3         11           Opercular syndrome         3         11           Length of stay (days)         *         *           Minimum         5         *         *           Maximum         5         *         *	Site		
Right         10         38           Bilateral         1         4           Contracoup injury         *         *           Yes         8         31           No         18         69           Associated injury         *         *           Yes         20         77           No         6         23           Management         *         *           Conservative         15         57           Craniotomy         9         34           Drakes         2         9           GOS         *         *           5         6         23           4         11         42           3         6         23           Neurological deficits         *         *           Nil         17         65           Hemiparesis         3         11           Opercular syndrome         3         11           Length of stay (days)         *         *           Minimum         2         *           Age (years)         *         *           Minimum         5         *	Left	15	58
Bilateral       1       4         Contracoup injury       7         Yes       8       31         No       18       69         Associated injury       7         Yes       20       77         No       6       23         Management       7       0         Conservative       15       57         Craniotomy       9       34         Drakes       2       9         GOS       6       23         4       11       42         3       6       23         4       11       42         3       6       23         Nil       17       65         Hemiparesis       3       11         Opercular syndrome       3       11         Length of stay (days)       Minimum       2         Maximum       52       Age (years)       4         Minimum       5       5       5         Maximum       78       5       5	Right	10	38
Contracoup injury         Yes         8         31           No         18         69           Associated injury             Yes         20         77           No         6         23           Management             Conservative         15         57           Craniotomy         9         34           Drakes         2         9           GOS          23           4         11         42           3         6         23           1         3         12           Neurological deficits          12           Nil         17         65           Hemiparesis         3         11           Opercular syndrome         3         11           Length of stay (days)          11           Maximum         52            Age (years)             Minimum         5            Maximum         78	Bilateral	1	4
Yes         8         31           No         18         69           Associated injury             Yes         20         77           No         6         23           Management             Conservative         15         57           Craniotomy         9         34           Drakes         2         9           GOS         6         23           4         11         42           3         6         23           1         3         12           Neurological deficits          11           Nil         17         65           Hemiparesis         3         11           Opercular syndrome         3         11           Length of stay (days)          Maximum           Minimum         2            Age (years)             Minimum         5            Maximum         78	Contracoup injury		
No         18         69           Associated injury         7           Yes         20         77           No         6         23           Management         2         20           Conservative         15         57           Craniotomy         9         34           Drakes         2         9           GOS         6         23           4         11         42           3         6         23           1         3         12           Neurological deficits         7         65           Hemiparesis         3         11           Opercular syndrome         3         11           Length of stay (days)         7         4           Maximum         52         2           Age (years)         78         5	Yes	8	31
Associated injury           Yes         20         77           No         6         23           Management         15         57           Craniotomy         9         34           Drakes         2         9           GOS         2         9           GOS         6         23           4         11         42           3         6         23           1         3         12           Neurological deficits         7         65           Hemiparesis         3         11           Opercular syndrome         3         11           Length of stay (days)         7         4           Maximum         52         4           Age (years)         7         5           Maximum         5         7	No	18	69
Yes         20         77           No         6         23           Management         2         9           Conservative         15         57           Craniotomy         9         34           Drakes         2         9           GOS         6         23           4         11         42           3         6         23           1         3         12           Neurological deficits         7         65           Hemiparesis         3         11           Opercular syndrome         3         11           Length of stay (days)         7         4           Minimum         2         4           Age (years)         7         5           Minimum         5         7	Associated injury		
No         6         23           Management         Conservative         15         57           Craniotomy         9         34           Drakes         2         9           GOS         5         6         23           4         11         42         3           3         6         23         1           1         3         12         Neurological deficits           Nil         17         65           Hemiparesis         3         11           Opercular syndrome         3         11           Length of stay (days)         Minimum         2           Maximum         52         Age (years)         78	Yes	20	77
Management         15         57           Craniotomy         9         34           Drakes         2         9           GOS         5         6         23           4         11         42         3           3         6         23         1           1         3         12         Neurological deficits           Nil         17         65           Hemiparesis         3         11           Opercular syndrome         3         11           Length of stay (days)         Minimum         2           Maximum         52         Age (years)         78	No	6	23
Conservative         15         57           Craniotomy         9         34           Drakes         2         9           GOS         5         6         23           4         11         42         3           3         6         23         1           1         3         12         Neurological deficits           Nil         17         65           Hemiparesis         3         11           Opercular syndrome         3         11           Length of stay (days)         Minimum         2           Maximum         52         Age (years)         78	Management		
Craniotomy         9         34           Drakes         2         9           GOS         5         6         23           5         6         23         1           4         11         42         3         6         23           1         3         12         Neurological deficits         17         65           Nil         17         65         11         11         12           Neurological deficits         3         11         0         11         12           Neurological deficits         3         11         11         12         11         12         11         12         11         12         11         12         11         12         11         11         12         11         11         12         11         12         11         11         12         11         11         12         11         11         12         11         11         12         11         12         11         12         11         12         11         12         12         11         12         12         12         12         12         12         12         12	Conservative	15	57
Drakes         2         9           GOS         5         6         23           4         11         42         3           3         6         23         1           1         3         12         12           Neurological deficits         7         65           Hemiparesis         3         11           Opercular syndrome         3         11           Length of stay (days)         7         4           Maximum         2         2           Age (years)         5         7           Maximum         78         5	Craniotomy	9	34
GOS       5       6       23         4       11       42         3       6       23         1       3       12         Neurological deficits       7       65         Hemiparesis       3       11         Opercular syndrome       3       11         Length of stay (days)       7       4         Maximum       5       7         Minimum       5       78	Drakes	2	9
5       6       23         4       11       42         3       6       23         1       3       12         Neurological deficits       7         Nil       17       65         Hemiparesis       3       11         Opercular syndrome       3       11         Length of stay (days)       11       12         Maximum       2       2         Age (years)       5       3         Minimum       5       78	GOS		
4     11     42       3     6     23       1     3     12       Neurological deficits     12       Nil     17     65       Hemiparesis     3     11       Opercular syndrome     3     11       Length of stay (days)     11     12       Minimum     2     2       Age (years)     5     3       Minimum     5     3	5	6	23
3         6         23           1         3         12           Neurological deficits             Nil         17         65           Hemiparesis         3         11           Opercular syndrome         3         11           Length of stay (days)             Minimum         2            Age (years)             Minimum         5            Maximum         78	4	11	42
1312Neurological deficits1765Nil1765Hemiparesis311Opercular syndrome311Length of stay (days)11Minimum2Maximum52Age (years)5Minimum5Maximum78	3	6	23
Neurological deficitsNil1765Hemiparesis311Opercular syndrome311Length of stay (days)2Minimum2Age (years)52Minimum5Maximum78	1	3	12
Nil1765Hemiparesis311Opercular syndrome311Length of stay (days)	Neurological deficits		
Hemiparesis311Opercular syndrome311Length of stay (days)11Minimum2Maximum52Age (years)5Minimum5Maximum78	Nil	17	65
Opercular syndrome311Length of stay (days)2Minimum2Maximum52Age (years)5Minimum5Maximum78	Hemiparesis	3	11
Length of stay (days) Minimum 2 Maximum 52 Age (years) Minimum 5 Maximum 78	Opercular syndrome	3	11
Minimum2Maximum52Age (years)5Minimum5Maximum78	Length of stay (days)		
Maximum52Age (years)Minimum5Maximum78	Minimum	2	
Age (years) Minimum 5 Maximum 78	Maximum	52	
Minimum 5 Maximum 78	Age (years)		
Maximum 78	Minimum	5	
	Maximum	78	

#### • Laterality of injury

The left side was involved in 58% of the cases, while the right side was involved in 38% of the cases. Bilateral involvement was seen in one case. Associated injuries were seen in 77% of the cases.

#### Severity of injury

Most of the patients presented with mild head injury (46%), whereas moderate and severe head injuries were seen in 23% and 31% of cases, respectively.

### Mode of management

Most of the patients were managed conservatively (57%). Craniotomy was performed in 34% of cases and Drake's craniactomy in 9% of them.

# Outcome of patients

About 42% of the patient revealed a GOS of four at 3 months [Figure 5] and 23% attained a GOS of five. The overall mortality in the series was 12%.

Neurological deficits

About 65% of the patients attained full recovery. Hemiparesis was seen in 11% of the patients, and opercular syndrome was seen in 11% of them [Table 1].

## Discussion

Eponymously named after the French surgeon Charles Labbe, the vein of Labbe (inferior anastomotic vein) crosses the temporal lobe between the Sylvian fissure and the transverse sinus and connects the superficial middle cerebral vein and the transverse sinus.

Because there is a higher affinity for early uncal herniation and rapid neurological deterioration, any traumatic temporal lobe lesion imposes an enigma to every neurosurgeon.

Impact injury and counterblow are the main reasons to the injury of Labbe vein, which consequently leads to serious traumatic cerebral infarction and bad prognosis.<sup>[7]</sup> Temporal bone fracture was associated in 15 of all the 16 cases in the study done by Long et al.<sup>[7]</sup> when compared with the results of 20 of 26 patients in our study.

In a study by Giannetti,<sup>[11]</sup> CT scan findings such as mediolateral diameter of the lesion, location of the hematoma, status of the ambient cisterns, and position of the midline structures were used as the criteria to decide which patients benefit from early surgery. The mean volume of the lesion in the patients undergoing operation was 25 mL. The mortality among the patients who were operated on was 50% and, among those who were managed conservatively, 22.7% compared with 12% in our study. In a study by Long et al.,<sup>[7]</sup> five of 16 patients ended up in a vegetative state.

Multidetector CT venography of patients with blunt head trauma revealing skull fractures that stretch out to a dural venous sinus or jugular bulb identified DVST in 40.7% of cases, and of these, 55% were occlusive.<sup>[12]</sup> There is a high risk of evolution of the vein of Labbe hemorrhagic infarction in the subsets of patients with petrous bone fracture. So, proper monitoring is justified for any signs and symptoms of increased intracranial pressure.

Moreover, given the eloquent nature of the brain that vein of Labbe drains, there is a need for a long-term follow-up of these patients in determining the neurological sequel of these patients, especially in terms of memory.<sup>[13]</sup>

The strength of our study is the focus on one of the important aspects of neurotrauma, wherein critical management is upmost for a better management of the patients with traumatic head injury. The limitations include small volume of patients and the inability to perform MR venography in all the patients with severe traumatic brain injury in all trauma centers to correctly diagnose the entity.

# Conclusion

A high index of suspicion needs to be taken in patients with petrous bone fracture for probable vein of Labbe hemorrhagic infarction following transverse sinus thrombosis. In those with traumatic venous infarction, stringent monitoring needs to be taken for evidence of early uncal herniation. In the case of lesions more than 25 mL, anisocoria, uncal herniation, and asymmetric ambient cisterns, early surgical evacuation is justified.

## References

- Stiefel D, Eich G, Sacher P. Posttraumatic dural sinus thrombosis in children. Eur J Pediatr Surg 2000;10(1):41–4.
- Miller JD, Jennett WB. Complications of depressed skull fracture. Lancet 1968;2(7576):991–5.
- Carlucci GA. Injury to the longitudinal sinus accompanying a depressed fracture of the skull. Am J Surg 1939;45(1):120–4.

- Kaplan A. Compound depressed fractures of the skull involving the superior longitudinal sinus. Am J Surg 1947;74(1):80–5.
- Reilly HP Jr, Erbengi A, Sachs E Jr, Dyke JR. Penetration of the sagittal sinus by a depressed skull fracture: roentgenographic diagnosis in an asymptomatic boy. JAMA 1967;202(8):841–2.
- Kinal ME. Traumatic thrombosis of dural venous sinuses in closed head injuries. J Neurosurg 1967;27(2):142–5.
- Long LS, Xin ZC, Wang WM, Zhao ZH, Zhang JZ, Li XL, et al. [Clinic analysis of 16 patients of craniocerebral trauma with Labbé vein injury]. Zhonghua Wai Ke Za Zhi 2011;49(11):1022–5.
- Heiskanen O, Vapalahti M. Temporal lobe contusion and haematoma. Acta Neurochir (Wien) 1972;27(1):29–35.
- 9. Maurice-Williams RS. Temporal lobe swelling: a common treatable complication of head injury. Br J Surg 1976;63(3):169–72.
- McLaurin RL, Helmer F. The syndrome of temporal-lobe contusion. J Neurosurg 1965;23(3):296–304.
- 11. Giannetti AV. Post-traumatic temporal lobe lesions: natural history and treatment. Arq Neuro-Psiquiatr 1998;56(4):859.
- Delgado Almandoz JE, Kelly HR, Schaefer PW, Lev MH, Gonzalez RG, Romero JM. Prevalence of traumatic dural venous sinus thrombosis in high-risk acute blunt head trauma patients evaluated with multidetector CT venography. Radiology 2010;255(2):570–7.
- Smith EE, Kosslyn SM. Cognitive Psychology: Mind and Brain. New Jersey: Prentice-Hall, 2007. pp. 21, 194–9, 349.

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