

## Morphology of Sylvian Fissure: A Cadaveric Study

Jaya Kadam<sup>1</sup>, Abhijeet Yadav<sup>2</sup>

### Abstract

Sylvian fissure is one of the most important landmarks of human cerebral hemisphere, with necessary surgical landmarks situated around its vicinity. Therefore, a research was designed to study the morphology of this anatomically and surgically significant fissure. The natural upward retraction of the apex of the pars triangularis commonly creates the largest opening in the superficial compartment of the sylvian fissure and provides an area on the convexity where the sylvian fissure is widest, and where it is often safest to begin opening the fissure. 58 formalin fixed cerebral hemispheres were taken and studied. 29/58 (50%) specimens exhibited U pattern while V and Y pattern was exhibited by 19/58 (32.76%) and 10/58 (17.24%) specimens respectively. most common pattern observed is U, followed by V & then Y. This study was then performed and carried further with comparing the difference in morphology of both sides.

**Keywords:** Morphology; Sylvian Fissure; Pars Triangularis; Middle Cerebral Artery.

### Introduction

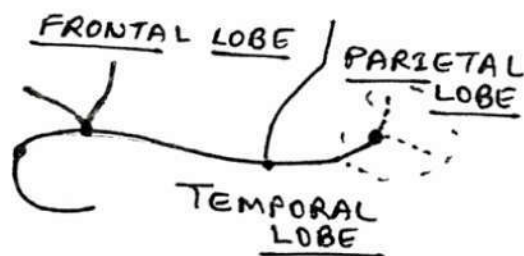
The human nervous system is the most complex product of biological evolution. The sylvian fissure is the most distinct and consistent landmark on the lateral surface [1]. It is a complex fissure that carries the middle cerebral artery and its branches and provides a surgical gateway connecting the cerebral surface to the anterior part of the basal surface and cranial base [2]. Various previous researches explained about asymmetry of brain, temporal lobe and sylvian fissure [3,4,5]. The medial wall of the sylvian fissure, formed by the insula, is seen only when the lips of the sylvian fissure are widely separated, except in the area below the inferior angle of the pars triangularis, which is often retracted upward to expose a small area of the insular surface [6]. The apex of the pars triangularis is sited directly lateral to the anteroinferior part of the circular sulcus and the anterior limit of the basal ganglia [7,8].

The present study is performed to study the morphology of sylvian fissure in 58 formalin fixed cerebral hemispheres. A comparison on both sides was also done.

### Material and Method

#### *Sylvian Fissure*

The present study included formalin fixed 29 brains (58 right and left cerebral hemispheres). Intact arachnoid mater were used to measure lengths of all segment sofsylvian fissure.



Sylvian Fissure between Frontal lobe, parietal lobe, and Temporal lobe.

P Ob=Pars orbitalis, P T=Pars Triangularis, P Op=Pars Opercularis

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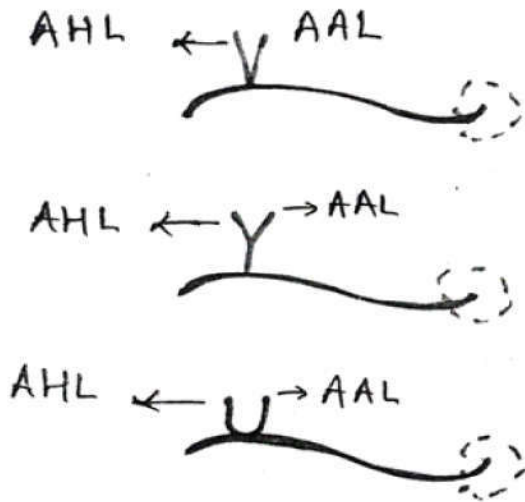
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Morphology of sylvian fissure V, Y, U patterns based on anterior horizontal limb (AHL) and anterior ascending limb (AAL) were recorded.



**Observation and Results**

“U, V and Y” patterns are based upon anterior horizontal limb & anterior ascending limb. In our study of 58 right and left cerebral hemispheres we examined morphology of sylvian fissure related with anterior horizontal limb and anterior ascending limb.

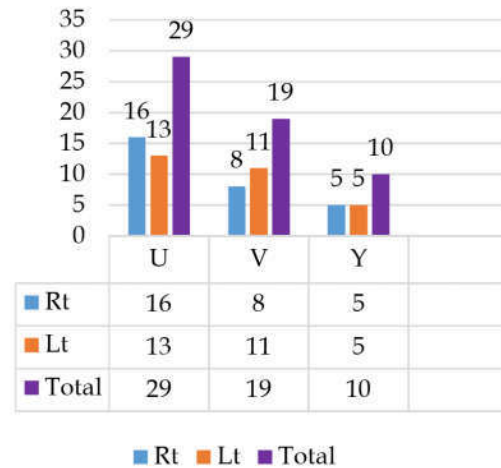
Total 29/58 (50%) specimens exhibited U pattern while V and Y pattern was exhibited by 19/58 (32.76%) and 10/58 (17.24%) specimens

**Table 1:** Sylvian fissure morphology

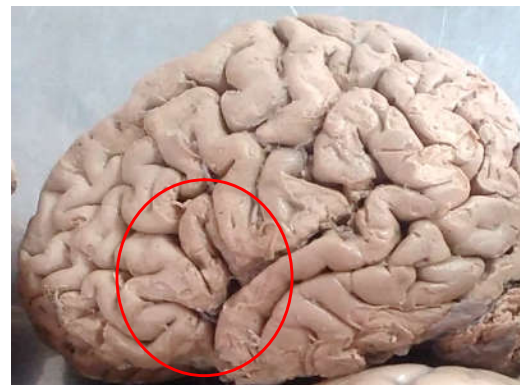
S. No.	Morphological Parameter	Number (no.)			Percentage (%)		
		Rt.	Lt.	Total	Rt.	Lt.	Total
1	U Pattern	16	13	29	55.17% (16/29)	44.82% (13/29)	50% (29/58)
2	V Pattern	08	11	19	27.58% (8/29)	37.93% (11/29)	32.76% (19/58)
3	Y Pattern	05	05	10	17.24% (5/29)	17.24% (5/29)	17.24% (10/58)

respectively. On right side 16/29 (55.17%) specimens exhibited U pattern while V and Y pattern was exhibited by 8/29 (27.58%) and 5/29 (17.24%) specimens respectively. On left side 13/29 (44.82%) specimens exhibited U pattern while V and Y pattern was exhibited by 11/29 (37.93%) and 05/29 (17.24%) specimens respectively.

This indicates that most common pattern observed is U, followed by V. Least common pattern is Y.



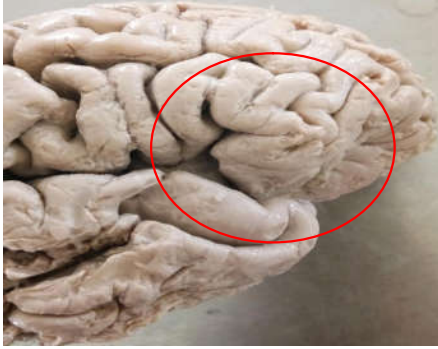
**Graph 1:** Sylvian fissure morphology



**Fig. 1:** Sylvian Fissure Morphology (V pattern of anterior horizontal limb and anterior ascending limb)



**Fig. 2:** Sylvian Fissure Morphology (U pattern of anterior horizontal limb and anterior ascending limb)



**Fig. 3:** Sylvian Fissure Morphology (Y pattern of anterior horizontal limb and anterior ascending limb)

## Discussion

In our study we examined morphology of sylvian fissure in relation with anterior horizontal limb and anterior ascending limb in 58 cerebral hemispheres. Out of the total 58 specimens 29 (50%) exhibited U pattern while V and Y patterns were exhibited by 19 (32.76%) and 10 (17.24%) specimens respectively. On right side 16/29 (55.17%) specimens exhibited U pattern while V and Y patterns were exhibited by 8/29 (27.58%) and 5/29 (17.24%) specimens respectively. On left side 13/29 (44.82%) specimens exhibited U pattern while V and Y patterns were exhibited by 11/29 (37.93%) and 05/29 (17.24%) specimens respectively. So in our study most common pattern observed is U, followed by V & then Y.

According to Sudakshina et al. (2015) morphology of sylvian fissure related with anterior horizontal limb and anterior ascending limb was observed in 60 cerebral hemispheres. In their study 52/120 (43.3%) specimens exhibited U pattern while V and Y patterns were exhibited by 42/120 (35%) and 26/120 (21.6%) specimens respectively [9]. On right side, 32/60 (53.3%) specimens exhibited U pattern while V and Y patterns were exhibited by 20/60 (33.3%) and 8/60 (13.3%) specimens respectively. On left side, 20/60 (33.3%) specimens exhibited U pattern while V and Y patterns were exhibited by 22/60 (33.6%) and 18/60 (30%) specimens respectively. Thus the result of their study correlates with result of our study.

According to Giyas and Ayberk (2012) 3/13 (20.3%) specimens exhibited U pattern while V and Y patterns were exhibited by 6/13 (40.61%) and 4/13 (30.76%) specimens respectively on right side. On left side 5/14 (35.71%) specimens exhibited U pattern while V and Y patterns were exhibited by 2/14 (14.29%) and 7/14 (50%) specimens respectively [10].

So they observed most common pattern as Y followed by U and V respectively.

## Conclusion

The most common pattern of sylvian fissure morphology is based on anterior ascending limb and anterior horizontal limb of pars triangularis area. In our study most common pattern observed is U, followed by V & then Y. Out of the total 58 specimens 29 (50%) exhibited U pattern while V and Y patterns were exhibited by 19 (32.76%) and 10 (17.24%) specimens respectively.

So in our study most common pattern observed is U, followed by V & then Y. The study is of importance to anatomists and neurosurgeons during the time of dissection as well as performing neurosurgery.

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