

TABLE V
THE SEGMENTED BRAIN AREA'S AVERAGE ERROR

No.	Result Value		Error (%)
	References (mm ²)	System (mm ²)	
1	19539.4	20649.1	5.6
2	17721.28	18655.2	5.2
3	19327	22368.1	15.7
4	17980.5	17504.5	2.6
5	25575	26880	5.1
6	22850	22576.9	1.1
7	22944	22673.4	1.1
8	20352	21558	5.9
9	22350	21995	1.5
10	23429.55	28063.5	19.7
11	17252.6	17043.6	1.2
12	21177.75	22905	8.1
Average Error			6.1

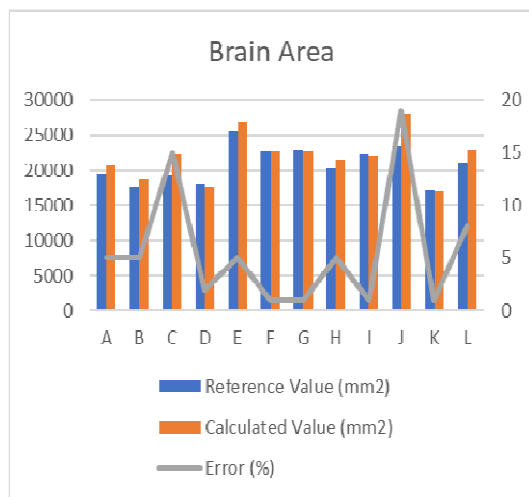


Fig. 16. Comparison chart of calculated brain areas and references

Fig. 16 shows a graph of reference and calculated brain area value. From the graph, it can be analyzed that the value of the area ratio calculated by the area of reference affects the error rate. If the difference between the reference value and the calculated value is high, then the error gets bigger. But, if the difference between the reference value and the calculated value is low, so the error rate gets smaller.

IV. CONCLUSIONS

The experimental results provide the conclusion that before segmentations brain tumors, the part that must be removed first is the skull shell because the skull shell has the same color as the object of the brain tumor. The process of the skull cutting was carried out using the segmentation using watershed method with initializing two lines. The brain tumors segmentation is done using the thresholding. And then, the biggest contour was conducted to separate

tumor objects from other tissues. The average error obtained from the calculation of the system test for the tumor area is 10,5%, while the average calculation of the brain area error is 6,1%.

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