

## SPINAL CORD-SUBARACHNOID SPACE RATIO AT CERVICAL REGION IN NORMAL THAI PEOPLE.

Pichest METARUGCHEEP M.D.

### ABSTRACT

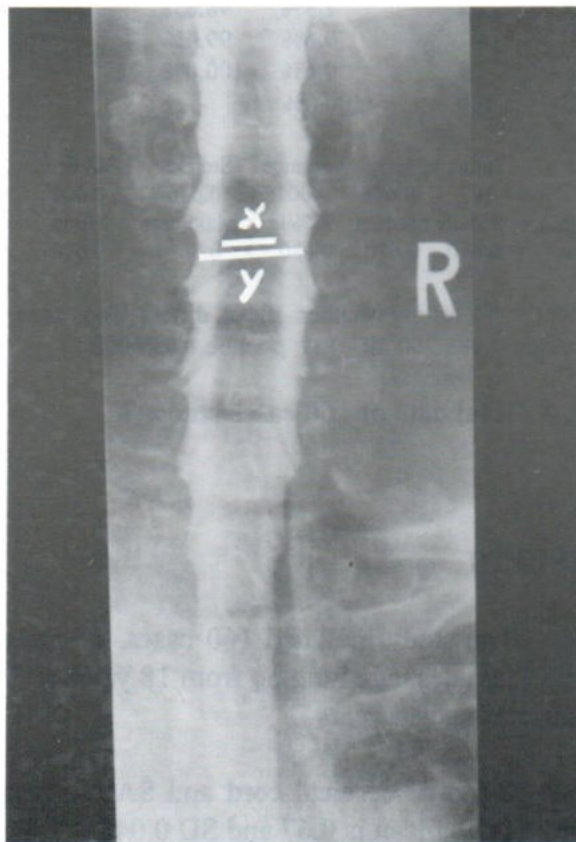
Measurement of transverse diameter of cervical cord & subarachnoid space between C4-C6 region was performed. The ratio between them was analysed in 160 cases of patients suffering from low back without neck symptom and submitted to water soluble myelogram. The normal spinal cord – subarachnoid space ratio (C/SAS) is in the range of 0.57-0.79, mean is 0.67 and SD 0.046. This can be used as the indicator of abnormal size of the spinal cord in myelographic interpretation if the ratio is under 0.57 or above 0.77. (mean + 2SD.)

### INTRODUCTION

Even though, at present, there is modern equipment such as MRI that can be used to investigate the spinal cord, non invasively. But due to the high cost of MRI, spinal cord investigation with contrast (Myelogram) still be necessary. Myelographic picture at cervicothoracic region which is the cervical cord normal enlargement is hard to differentiated form abnormal enlargement from any intrinsic pathology. This is due to no normal value for comparison. So, this come to the study of normal value by measurement of the width of cervical cord and the SAS at same level and by using the ratio of the width of cervical cord and SAS for normal indicator.

### MATERIALS AND METHODS

Data of this study is from the patients that come to investigate by lumbar myelogram and no neck symptom from 1991 to 1996. Addition cervical myelogram was done followed by measurement of the spinal cord width and SAS at C4 to C6 level. The AP view is the standard picture. (Fig. 1) All data are submitted to be analysed and interpreted statistically. (Fig.2 & Fig.3 & Fig.4)



**Fig. 1** Cervical myelogram of normal patient with C/SAS ratio (X/Y) = 0.68

C/SAS	Freq	Percent	Sum
0.57	5	3.1%	3.1%
0.58	6	3.8%	6.9%
0.59	5	3.1%	10.0%
0.60	2	1.3%	11.3%
0.61	4	2.5%	13.8%
0.62	3	1.9%	15.6%
0.63	6	3.8%	19.4%
0.64	10	6.3%	25.6%
0.65	12	7.5%	33.1%
0.66	15	9.4%	42.5%
0.67	29	18.1%	60.6%
0.68	24	15.0%	75.6%
0.69	12	7.5%	83.1%
0.70	3	1.9%	85.0%
0.71	2	1.3%	86.3%
0.72	5	3.1%	89.4%
0.73	3	1.9%	91.3%
0.74	4	2.5%	93.8%
0.75	4	2.5%	96.3%
0.76	2	1.3%	97.5%
0.77	2	1.3%	98.8%
0.78	1	0.6%	99.4%
0.79	1	0.6%	100.0%
Total	160	100.0%	

Total	Sum	Mean	Variance	Std Dev	Std Err
160	107	0.666	0.002	0.046	0.004
Minimum	25%ile	Median	75%ile	Maximum	Mode
0.570	0.640	0.670	0.680	0.790	0.670

Student's "t", testing whether mean differs from zero.  
 T statistic = 185.200. df=159 p-value = 0.00000

Fig. 2 Total data of 160 cases study.

**RESULTS**

The study included 160 cases, 77 males and 83 females, age ranging from 18 years to 75 years, average 46 years.

Ratio of cervical cord and SAS is from 0.57 to 0.79, mean is 0.67 and SD 0.046.

C/SAS in male is 0.57 to 0.76, mean 0.66.

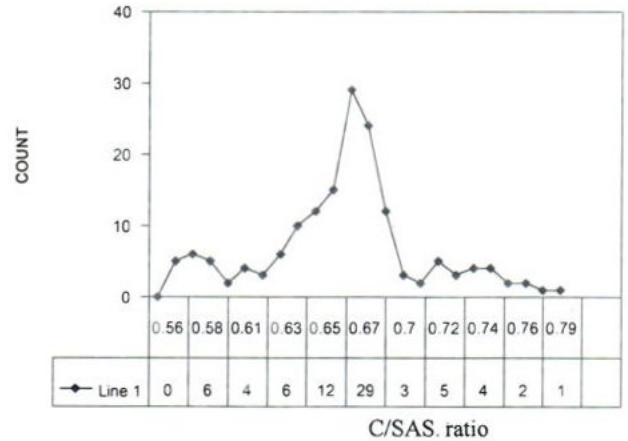


Fig. 3 Graph shows relationship between amounts of the patient and C/SAS ratio.

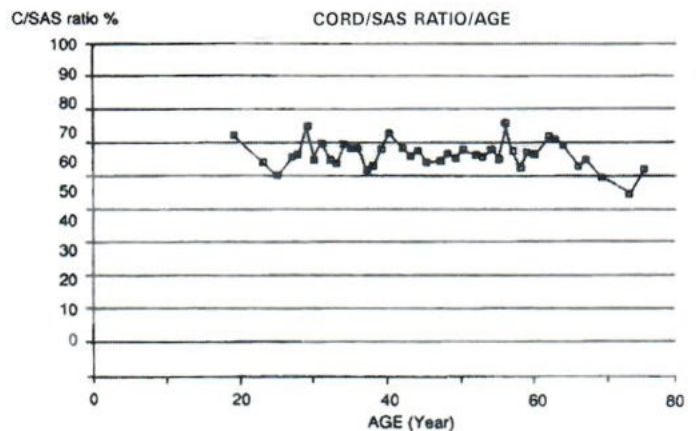


Fig. 4 Graph show relationship between age and C/SAS ratio.

C/SAS in female is 0.57 to 0.79, mean 0.68.

C/SAS as correlated with age is shown by linear graph (Fig.4) and there is no significant change on aging.

## COMPARATIVE STUDY

### CASE 1

A 22 years old female presented with numbness of both hands for 5 months, progressive from hand to arm.

PE : Suspension sensory loss up to C5.,

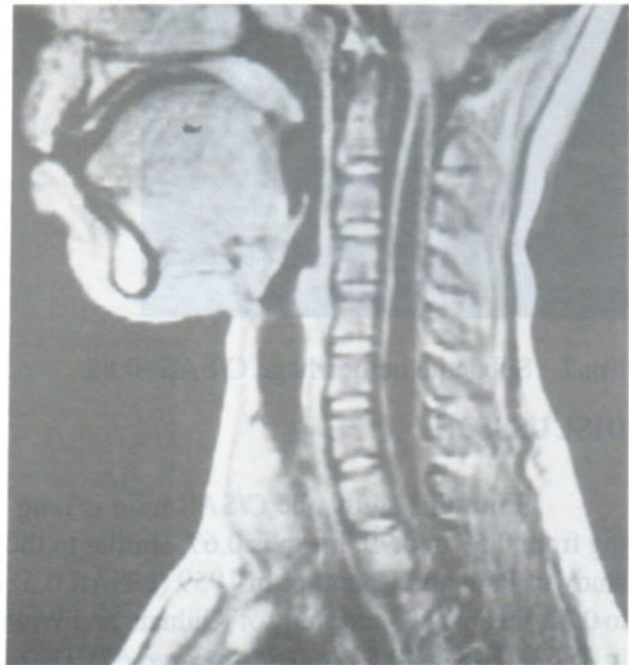
Spastic both legs.

Myelogram : Fusiform enlargement of the cervical cord with C/SAS ratio 0.83.

MRI : Syringomyelia C1 to C7 level. (Fig.5 & Fig.6)



**Fig. 5** Syringomyelia C/SAS = 0.83



**Fig.6** MRI of the same patient as Fig.5

## CASE 2

A 29 years old male presented with neck pain especially on extension, left extremity weakness and numbness of right side of the body, progressive for the past 2 months.

Myelogram : Focal fusiform enlargement

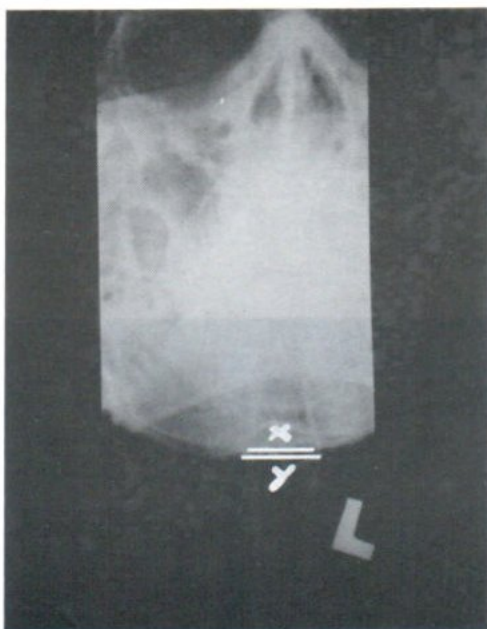


Fig.7 Subacute hemorrhage C/SAS=0.88

## DISCUSSION

From this study, the C/SAS ratio is ranging from 0.57 to 0.79, mean is 0.67, similar to the study of Paul and Chandler in 1959 (C/SAS 0.52 to 0.73, mean 0.63) and study of Khilnani and Wolf in 1963. (C/SAS 0.53 to 0.78, mean 0.67) There is no significant difference of C/SAS ratio in two genders, as well as, in aging.

The ratio of C/SAS is abnormal if it is under 0.57 or above 0.77 (mean + 2SD)

For comparative study, we have shown 2 cases of abnormal enlargement of the spinal cord. One is due to Syringomyelia and another one,

of the upper cervical cord with C/SAS ratio 0.88.

MRI : Subacute hemorrhage at upper cervical cord size about 9 mm. in diameter with mild perifocal cord edema. (Fig.7 & Fig.8)



Fig.8 MRI of the same patient as Fig.7

intrinsic cord hemorrhage and swelling. The C/SAS ratio is 0.83 and 0.88 respectively.

## REFERENCES

1. Paul LW, Chandler A. Myelography in expanding lesions of the cervical spinal cord. Exhibit at 45<sup>th</sup> Annual Meeting of the Radiological Society of North America, Chicago: Nov. 1959:15-20.
2. Khilnani MT, Wolf BS. Transverse diameter of cervical spinal cord on pantopaque myelography. J Neurosurg 1963; 20: 660-1.