Single Concave Correction Technique for Main Thoracic Curve Scoliosis Lenke Classification Type 1

Rahyussalim AJ\textsuperscript{1}, Ifran Saleh\textsuperscript{1}, T Kurniawati\textsuperscript{2}, M. Triadi Wijaya, Ahmad Yanuar Safri\textsuperscript{3}

\textsuperscript{1}Department of Orthopaedic and Traumatology Faculty of Medicine Universitas Indonesia-Cipto Mangunkusumo Hospital. 
\textsuperscript{2}Stem Cell Integrated Medical Service Unit Cipto Mangunkusumo Hospital-Faculty of Medicine Universitas Indonesia.  
\textsuperscript{3}Neurophysiology Division, Department of Neurology Faculty of Medicine Universitas Indonesia-Cipto Mangunkusumo Hospital.

INTRODUCTION: Idiopathic scoliosis Lenke 1 are found in 30-40\% of all patients with idiopathic scoliosis. Usually, type 1 Lenke curvature is not as extreme and commonly found in adolescents and adults. In term of anatomical structure, the main thoracic curve in this scoliosis is supported/ surrounded by ribs which strengthen the structure of the spine in order to gain stability. Scoliosis surgery for this type can be done by using the anterior approach technique, thoracoplasty, or posterior approach using a spinal derotation technique which typically done by fixing a pedicle screw and rod on both sides. We have developed another approach to operations idiopathic scoliosis Lenke-1 called Single Concave Correction Technique (SCCT) based on anatomical structure and the biomechanic of main thoracic curve which works mainly on the concave side to provide adequate correction. This paper reports the results of operations using SCCT approach to evaluate the advantages of SCCT compared to other techniques currently established.

METHODS: SCCT is a scoliosis surgery using posterior approach on one side of the concave area. The correction is done by installing 4 to 5 screws to adjust the curvature shape of the main thoracic on the upper spine curve and 4 to 5 screws on the lower vertebrae curve, straightening is done by unbending the curvature, and derotating of the spinal rotation. Meanwhile, kyphosis can be managed by manipulating the anteroposterior side.

RESULT: We reported 3 cases of adolescent scoliosis and 1 case of adult scoliosis surgery with SCCT with follow-up period of 6 months, as follows:

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|}
\hline
Evaluation & Patient & KN & YN & AP \\
\hline
Screws amount (pcs) & 7 & 9 & 11 \\
Rod amount (pcs) & 2 & 2 & 2 \\
Rod connector amount (pcs) & 1 & 1 & 1 \\
Duration of surgery (minutes) & 130 & 110 & 150 \\
Bleeding (cc) & 200 & 300 & 260 \\
Post operation hospitalized (days) & 5 & 4 & 5 \\
Pre operation curve (degree) & 70 & 72 & 79 \\
Post operation curve (degree) & 26 & 21 & 36 \\
\hline
\end{tabular}
\caption{Evaluation of three cases with SCCT approach. It shows less screws and bloodless}
\end{table}

DISCUSSION AND CONCLUSION: SCCT improved surgery duration, minimal bleeding and shortening of length-of-stay. This was due to the correction that was done on one side so there would be less damage on the tissue compared to the conventional techniques which were done on two sides. SCCT also provided satisfactory corrections and significant addition of height because only a small number of screw and rod are used hence financially more efficient. In long term follow-up, we were optimistic that we will not find any major problems regarding the application of SCCT in scoliosis. Management of Idiopathic scoliosis type 1 (lenke classification) using SCCT approach provided good result after 6 months follow up.

REFERENCES: 
\textsuperscript{1}Ahmad Jabir Rahyussalim, Ifran Saleh, Dyah Purmaning, Tri Kurniawati (2016) Optimization correction strength using contra bending technique without anterior release procedure to achieve maximum correction on severe adult idiopathic scoliosis, Case Reports in Orthopaedics, Article ID 7396853. 