

“The informativity of the radiological signs in childrens with birth injuries”

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INTRODUCTION

According to different authors, traumatic injuries of the spine in children are found from 0.14% to 6.7% of all injuries of the musculoskeletal system. Over the past decades, indicators of spinal injuries in children have increased from 2.5% to 8%, which the authors explain as an increase in the activity of children and, mainly, an improvement in the methods of radiological diagnostics.

AIM

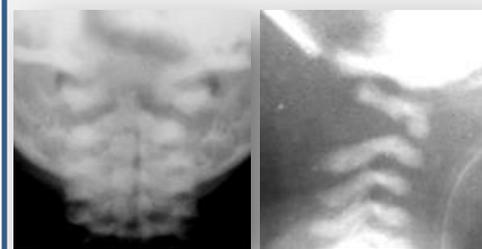
The aim of the study was to compare the data of various radiological methods. To determine the significance of radiological signs of different methods in the diagnosis of childbirth trauma. To conduct a correlation between the radiological signs and the clinical condition of the patient.

METHODOLOGY

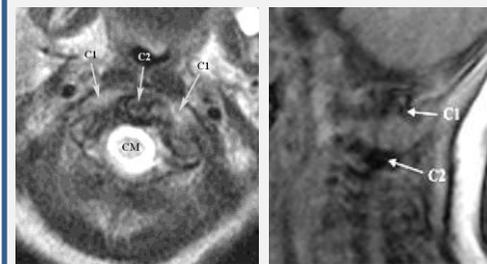
To assess the informational content of the radiological criteria the data of a roentgen, MRI and US examination of the upper-cervical spine (UCS) were analyzed in 60 newborns, 33 of them with neurological manifestations and 27 without them.

To calculate the information value of the criteria, the Wald-Genkin heterogeneous sequential procedure was used. The values of each criteria was divided into gradations, the diagnostic coefficient (DC) and information value (I) were determined. For this study, we used only those signs which had a high degree of informational value ($I \geq 3.0$).

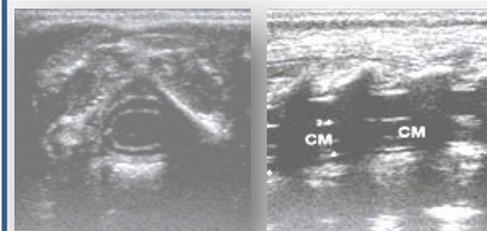
For the distribution of major groups into subgroups (by degrees of severity of injury of the upper cervical spine) used atlanto-axial coefficient (K): when the value of the coefficient $K = 0,85-0,67$ was diagnosed with a injury of mild degrees when $K = 0,66-0,57$ average degree, and if $K \leq 0,56$ was a difficult degree.



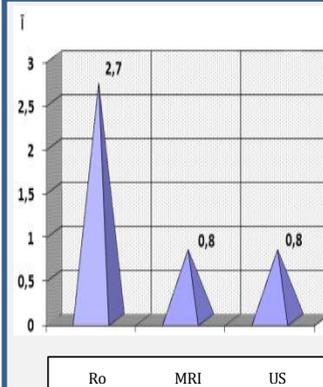
Patient N., 7 days, plain radiographs in 2 projections of upper cervical spine



Patient O., 13 days, MRI of upper cervical spine



Patient K., 8 days, US in 2 projections



CONCLUSION

This is the different informativity value of various radiological methods and signs that indicate injuries of the upper cervical spine, namely: asymmetry of lateral masses of atlant, change of height of lateral atlanto-axial joints, widening of the anterior atlanto-axial joint, widening soft tissues and angulating of the arcus of the first and second vertebrae.

Also different methods have different informative values, so in the newborns most diagnostic informative value of the roentgenography is much higher (2,7) than US and MRI (0,8). The correlation coefficient showed a moderately pronounced relationship between radiological signs and the severity of the patient's condition ($r > 0.4$).

RECOMMENDATIONS

This makes possible to recommend plain radiography for the diagnosis of injury of the upper cervical spine as a simple and less expensive technique with high informativeness.

RESULTS

In newborns: asymmetry of lateral masses of atlant - atlanto-axial coefficient (K) showed the highest diagnostic informative value $I = 12.85$, the values of the diagnostic coefficient (DC) for different coefficient meaning were as follows $>0.85 = +11.1$; $0.85-0.67 = -7.2$; $0.66-0.57 = -9.5$ and $\leq 0.56 = -13.1$; information value of the change of height of lateral atlanto-axial joints was $I = +9.42$, for different meaning of the coefficient of the DC value $\leq 2.0 = 2.9$; $\geq 2.5 = -5.1$; the DC values of the widening of the anterior atlanto-axial joint was $\leq 2.3 = 3.8$; $2.4-2.8 = -4.1$; $>2.8 = -9.0$, information value was $I = 4.35$; the widening of the prevertebral soft tissues (PST) at the level of C1 DC was $\leq 6.0 = 3.2$; $\geq 6.1 = -4.8$, the general informational value of the sign 3.29. The width of the PST at the level of C2 of the DC was $\leq 7.0 = +2.2$, $\geq 8.0 = -2.4$, the general information value of the sign was 4.29.

A comprehensive assessment of the diagnostic significance of each of the radiological diagnostic techniques revealed that roentgenology had most diagnostic potential ($\bar{I} = 2.7$) then MRI ($\bar{I} = 0.8$) and US ($\bar{I} = 0.8$). Given that the MRI and USG diagnostic differences are relatively small, they can be replaced by each other.

The correlation coefficient showed a moderately pronounced relationship between the height of the articular cleft and the severity of the patient's condition ($r > 0.4$).

A moderately pronounced correlation ($r > 0.4$) was also observed between the enlargement of the prevertebral soft tissues and the width of the articular cleft, and the severity of the patient at all.