

Forecasting of Local Intraoperative Complications of Hip Joint Endoprosthetics during Dysplastic Coxarthrosis

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Abstract

Has been carried out multi-dimensional statistical analysis of intraoperative complications of hip joint endoprosthetics on the basis of 129 patients with dysplastic coxarthrosis. Using regressive analysis, predictors of following intraoperative complications - nerve overstretching and fracture of diaphysis have been established. Results of investigation could be used during planning of operations in order to reveal the risk groups and prevent complications during endoprosthetics.

Keywords: *dysplastic coxarthrosis, endoprosthetics, intraoperative complications, predictors of complication*

Introduction

Degenerative-dystrophic pathologies of hip joint results in disfunctioning of entire the locomotor system. Pain and limitation of mobility eventually leads to patients disability. One of the most effective and perspective method of surgical treatment is the hip joint endoprosthetics.

Alteration of anatomical shape of acetabulum and femoral proximal portion results in changing of length of extremity and hip joint functioning.

Problematic and variety of mentioned pathology requires more detailed approach to the question of preoperative planning.

In this connection we have to change the sequence of surgical stages and take into account peculiarities of endoprosthesis components implantation.

Despite numerous investigations, analysis of mistakes and complications during endoprosthetics bears empiric

character conditioning the actuality of determination of complications objective causes during these operations.

The aim of our investigations was determination of risk factors and elaboration of intraoperative and postoperative complications prognostic programs.

Material and Methods

Total of 129 patients of Orthopedic Clinic "Sintezi" with dysplastic coxarthrosis and hip joint arthroprosthetics were under observation.

Methods of investigation were clinical and paraclinical (anamnesis, examination, roentgenography and etc.). Following parameters were estimated: age, sex, constitutional type, roentgenologic and roentgenometric characteristics of joint, stages of joints degenerative-dystrophic disorder, amplitude of mobility in joint, operative data, intraoperative and postoperative complications, factors of rehabilitation and etc. - total of 123 factors.

N	Signs	Coefficient of Regression	Standard Error	T Criterion
1	Disease duration >5years	0,084	0,042	2,02
2	Femoral sclerosis	0,152	0,051	2,96
3	Anatomical shortening of extremity	0,128	0,054	2,37
4	Functional shortening of extremity	-0,132	0,042	3,15
5	Diaphysis perforation	0,927	0,199	4,66

Tab.1 Coefficient of multivariate regression - (predictable sign - "Diaphysis fracture").

N	Signs	Coefficient of Regression	Standard Error	T Criterion
1	Fracture of trochanter	0,236	0,117	2,01
2	Lengthening of extremity >4cm	0,1	0,038	2,64
3	Short neck of prosthesis head	-0,085	0,047	1,96
4	Acetabular size >52mm	0,087	0,041	2,12

Tab.2 Coefficient of multivariate regression - (predictable sign - "Nerve overstretching").

Obtained data were analyzed by the method of multi-dimensional statistical analysis (correlation, multivariate logistic regression technique).

Results and Discussion

Detailed analysis of origin and cause of endoprosthetics complications has shown that intraoperative complications are related to technique of surgical intervention, method of prosthesis implantation and probably with negative action of cement on local tissue. However, technically well-done endoprosthetics with reliable constructions not always leads to positive result.

The local intraoperative complication - Diaphysis perforation (0,96%), diaphysis fracture (4,86%), trochanter break off (2,08%), nerve overstretching (4,17%).

The intraoperative fractures of bone fragments are expected during medullar canal elaboration as well as during prosthesis implantation. They could be conditioned by bones old defects and deformations, osteoporosis, soft tissue contractures - during dislocation of extremities.

Diaphysis fracture predictors are presented in *Tab. 1*.

The risk factors of diaphragm fractures in the process of operation are: disease duration (5 years, s femoral

sclerosis, anatomical shortening of extremity and perforation of diaphysis. Functional shortening of extremity represents a negative predictor.

Free member $A_0 = -0,011 \pm 0,003$

Nerve overstretching predictors are presented in *Tab.2*.

The risk factors of nerve overstretching are: excessive lengthening of extremity, acetabular size < 52 mm, fracture of trochanter.

The negative predictor is short neck of prosthesis head.

Equation of regression has a following expression:

$$Z = \sum A_i X_i \quad P = \frac{1}{1 + e^{-z}}$$

Where, the A is a coefficient of regression, X - meaning of sign, P - probability of complications development.

The results of investigation can be used during the planning of operation with purpose to reveal the risk groups and prevent complications during hip joint endoprosthetics.

References

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Прогнозирование местных интраоперационных осложнений эндопротезирования тазобедренного сустава при диспластическом коксартрозе

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Р Е З Ю М Е

На основе исследования 129 больных с диспластическим коксартрозом проведен многомерно-статистический анализ интраоперационных осложнений эндопротезирования тазобедренного сустава. С применением регрессионного анализа установлены предикторы следующих интраоперационных осложнений: перерастяжение нерва и перелом диафиза. Результаты исследования можно использовать при планировании операции для выявления групп риска и осложнений при эндопротезировании.

Ключевые слова: *диспластический коксартроз, эндопротез, интраоперационные осложнения, предикторы осложнений*