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## COMPLEX INJURY OF THE PELVIS IN CHILDREN

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*The authors mention in the paper their own experience with treatment of complex pelvic injury in children with polytrauma and give reasons for necessity of early stabilization of pelvic fractures by means of external fixation - especially with continuous hemorrhage into lesser pelvis region and the retroperitoneum.*

*Afterwards they use damage control surgery methods including selective embolization. In clinical group of patients treated during the period from 2000 to 2004 they evaluate results of this treatment.*

### INTRODUCTION

Increasing number of high-energy injuries brings about also in children increase in number of complex injuries of the pelvis, where apart from fractures of the pelvic girdle also arteries, nerves, soft tissues and pelvic intraperitoneal and retroperitoneal organs are injured. The most severe complication of these injuries consists in extensive hemorrhage, mainly from injured skeleton, a presacral and paravesical vascular plexes that can directly threaten life of the injured child by hemorrhagic traumatic shock. Diagnostic methods, apart from RTG pelvic, are ultrasonography, computer tomography and computed angiotomography [1]. The basis for the treatment of instable pelvic fractures consists of pelvic skeleton stabilization, which in the urgent stage is ensured by application of a pelvic clamp with subsequent application of external fixator [2, 3, 4, 5, 6].

In case of continuous hemorrhage we perform urgent AG with surgical treatment of injured arteries or their selective embolization [7]. In extensive devastating injuries we do not hesitate to perform tamponade of the pelvis with possible bilateral ligation of a. iliaca interna [8, 9].

### CLINICAL POPULATION

In the years 2000-2004 98 polytraumatized children were treated in the Traumatology Centre of University Hospital with Polyclinic in Ostrava, where in 15 pelvic injury was part of polytrauma. Most of them were stable fractures of the pelvic girdle.

In two cases fractures were complex, and only in a thirteen-year-old girl we were forced to urgent application of the external fixator on the pelvis because of progressive extraperitoneal hemorrhage (fig. 1, 2). After application the hemorrhage has stopped and the external fixator was removed after six weeks. The girl had concurrent injury of the CNS and compound fracture of the left crus, which was solved by means of external circular fixator. After removal of the external fixator she was discharged to ambulatory care.

### DISCUSSION

Another severe complication of pelvic injuries consists of occurrence of pelvic compartment syndrome, which incidence is from 3 to 5 %. Most frequently it occurs on the basis of intrapelvic pressure increase during retroperitoneal or intra-abdominal hemorrhage.

The pelvic compartment syndrome is divided in 3 types [10]. The most severe is mixed type combined with abdominal compartment syndrome, which gradually occurs with increase of retroperitoneal hematoma. This results in the increase of intraabdominal pressure with symptoms of abdominal compartment syndrome, negative effects on cardiovascular, pulmonary and mainly renal systems with subsequent oliguria [2, 11, 12, 13]. Development of intraabdominal pressure is monitored by measurement of intracystic pressure and when it exceeds 30-40 mm Hg we proceed to decompression laparotomy [14].

In combined injuries of the pelvis and abdominal cavity, in the last year we tried

to use damage control methods (stage laparotomy) with temporary closure of abdominal cavity using plastic foil or Ethizip and pelvic stabilization with the external fixator (fig. 3, 4).

## CONCLUSION

Complex injuries of pelvis may be life-threatening for children, what requires urgent surgical treatment focused on staunching the hemorrhage including tamponade, selective hemorrhage and pelvis stabilization by means of the external fixators.



Ryc. 1. Złamanie goleni leczone stabilizatorem zewnętrznym

Fig. 1. Fracture of the leg treated with external stabilizator



Ryc. 2. Złożone złamanie miednicy leczone stabilizatorem zewnętrznym

Fig. 2. Complex pelvic fracture treated with external stabilizator



Ryc. 4. Laparotomia z wszyciem folii i zamka Ethizip oraz zastosowanie stabilizatora zewnętrznego

Fig. 4. Laparotomy with use of foil, Ethiozip and external stabilizator



Ryc. 3. Obrażenia narządów jamy brzusznej i złożone złamanie miednicy

Fig. 3. Abdominal injuries and complex pelvic fracture

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## ZŁOŻONE USZKODZENIA MIEDNICY U DZIECI

Słowa kluczowe: miednica, złożone uszkodzenia, zespół ciasnoty, mnogie obrażenia ciała, dzieci.

W pracy autorzy omawiają swoje doświadczenie w leczeniu złożonych uszkodzeń miednicy u dzieci z mnogimi obrażeniami ciała, wskazując na konieczność wczesnej stabilizacji złamań miednicy przy użyciu zewnętrznych stabilizatorów w przypadkach stałego krwawienia do miednicy mniejszej i przestrzeni zaotrzewnowej.

Następnie stosują chirurgiczne metody kontrolowania uszkodzeń włącznie z wybiórczą embolizacją. Powyższe leczenie oceniano w klinicznej grupie pacjentów hospitalizowanych od 2000 do 2004 roku.

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