

COMPLEX INJURY OF PELVIS IN CHILDREN

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SUMMARY

Authors in their communication mention 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 during continuous hemorrhage into lesser pelvis region and 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.

KEY WORDS: *Complex injuries of pelvis, pelvic compartment syndrome, polytrauma in children.*

INTRODUCTION

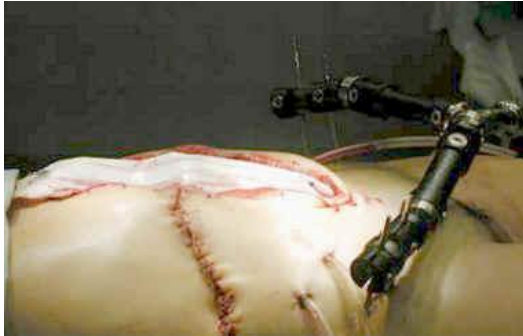
Increasing number of high energy injuries brings about also in children increase in number of complex injuries of pelvis, where apart from fractures of pelvic circle also arteries, nerves, soft tissues and pelvic intraperitoneal and retroperitoneal organs are injured. The most severe complication of these injuries consists in extensive hemorrhage, mainly from injured skeleton a presacral and paravesical vascular plexes that can directly threaten the life of the injured child by hemorrhagic traumatic shock. Diagnostic methods, apart from RTG pelvic, are sonography, computer tomography, and computed angiotomography. The basis for the treatment of instable pelvic fractures consists in stabilization of pelvic skeleton which in the urgent stage is ensured by application of a pelvic clamp with subsequent application of external fixator [1, 2, 3]. In case of continuous hemorrhage we perform urgent AG with surgical treatment of injured arteries or their selective embolization. In extensive devastating injuries we do not hesitate to perform tamponade of pelvis with possible bilateral ligature of *a. iliaca interna* [4, 5].

CLINICAL POPULATION

In the years 2000-2004 98 polytraumatized children were treated in traumatologic centre of teaching hospital with policlinic in Ostrava, where in 15 of cases pelvic injury was part of polytrauma. Most of them were stable fractures of pelvic circle, only in two cases the fractures were complex, and only in a thirteen-year-old girl we were forced to urgently apply external fixator on pelvis for progressive extraperitoneal hemorrhage into pelvis. (fig. 1, 2). After application of external fixator the hemorrhage was stopped and the external fixator was removed after six weeks. The girl had concurrent compound fracture of left crus, which was solved by means of external fixation of circular type, and CNS injury. After removal of external fixator she was discharged from hospital in home care.



Pict. N.1, 2



Pict. N. 3, 4

DISCUSSION

Another severe complication of pelvic injuries consists in occurrence of pelvic compartment syndrome, whose 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 III types, the most severe of which is the mixed type, combined with abdominal compartment syndrome that gradually occurs with increasing retroperitoneal hematoma and that results in the increase of intraabdominal pressure and whose symptoms are those of abdominal compartment syndrome with negative effects on cardiovascular, pulmonary and mainly renal systems with subsequent oliguria [1, 6, 7, 8]. Development of increasing intraabdominal pressure is monitored by means of measurement of intracystic pressure and when it exceeds 30 – 40 mm Hg we proceed to decompression laparotomy [9]. In combined injuries of pelvis and abdominal cavity in the last year we try to use damage control methods (stage laparotomy) with temporary enclosure of abdominal cavity by means of laparostomy using plastic foil or Ethizip and stabilization of complex fracture of pelvis by means of external fixator (fig. 3, 4).

CONCLUSION

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

REFERENCES

1. JOHNSON, K. D., CADAMBI, A., SEIBERT, B. Incidence of adult respiratory distress syndrome in patients with multiple musculoskeletal injuries: effect of early stabilization of fractures. *J Trauma*. 25, 1985, 5, 375–384.
2. PAPE, H. C., STALP, M., DUHLWEID, M. Optimal duration of primary surgery with regards to a „border-line situation in polytrauma patients. Arbeitsgemein-schaft „Polytrauma“ der Deutschen Gesellschaft für Unfallchirurgie. *Unfallchirurg*. 102, 1999, 11, 861–869.
3. PLEVA, L., JEČMÍNEK, VL., POSOLDA, T., SKOTNICOVÁ, S. Léčení zlomenin pánve zevní fixací u polytraumat. *Zp úraz chir*. 1, 1993, 2, s. 4–13.
4. MICHEK, J., PLEVA, L., WENDSCHE, P. *Poranění orgánů dutiny břišní a retroperitonea*. Ostrava: Cicero, 2001. 134 s.
5. PAPE, H.C., GIANNOUDIS, P., KRETTEK, C. The timing of fracture treatment in polytrauma patients, relevance of damage control orthopedic surgery. *Am J Surg*. 183, 2002, 6, 622–629.
6. KELLAM, J.F. Damage control orthopedic surgery. *AO Dialoge*. 16, 2003, 2, 25–26.
7. PLEVA, L., KLUS, I. Metody damage control úrazové chirurgie u polytraumat. *Úraz chir*. 12, 2004, 2, s. 1-5.
8. PLEVA, L., PRUSENOVSKÝ, P., KOPÁČEK, I. Abdominální kompartment syndrom u dětských polytrau-mat. *Úraz chir*. 11, 2003, 4, s. 5-8.
9. PLEVA, L.: *Zevní fixace v traumatologii*. 1. vyd. Ostrava: Cicero 1992, 175 s.
10. BOSSE, M.J., KELLAM, J.F. *Orthopedic Management Decisions in the Multiple Trauma Patient*. In: *Skeletal Trauma*. 3rd ed. Browner, B. D. Jupiter, J., Levine, A., et al. Philadelphia, 2003. 133–146.
11. CHMELOVÁ, J., PLEVA, L. Perkutánní fixace zlomenin pánve pod CT kontrolou. *Čes Radiol*. 56, 2002, 1, s. 16–20.

12. PLEVA, L., ROZUM, K., JEČMÍNEK, VL., PRUSENOVSKÝ, P. Zevní fixátor na acetabulum. *Úraz chir.* 8, 2000, 2, s. 1–10.
13. PLEVA, L., PRUSENOVSKÝ, P., KOPÁČEK, I. Abdominal compartment syndrome in children's polytrauma. *Rocznik Dziecięcej Chirurgii Urazowej.* XXXI, 2003, 7, 31–33.
14. TOMASZEWSKI, R., BIJATA, W. STARZAK, P., BOHOSIEWICZ, J. Two-stage treatment of an unstable fracture of the pelvic ring in a 4-year-old child. *Rocznik Dziecięcej Chirurgii Urazowej.* XXXII, 2004, 8, 123–128.

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