As reported in literature, undescended testis or cryptorchidism is detected in 3% of full-term male newborns, and in up to 33% of premature babies. As the testicular descent may sometimes resolve spontaneously during first months of life, cryptorchidism is found in 1% of boys one year old. According to Consensus of Nordic experts in pediatric urology regarding cryptorchidism, the optimal period for surgery is 12–18 months of age. The goal of this study was to identify the age of patients with congenital undescended testis at the time of surgery. **Material and Methods.** A retrospective study included all the cases of cryptorchid patients who had undergone orchidopexy in the period from 2007 to 2014. The patients’ age and the place of residence were analyzed. **Results.** A total of 637 patients (722 orchidopexies) underwent the elective operative treatment of undescended testis during the observed period. The analysis revealed that only 144 (22.60%) of cryptorchid infants were operated on within their first 18 months of life. In the group of 359 patients from the urban environment, 101 (28.13%) were operated under the age of 18 months. Among the 278 patients from the rural environment, 43 (15.46%) were 18 months and younger at the time of surgery. **Conclusion.** The timing of surgical treatment of undescended testis in the study period was far from the recommended optimal time. It is evidently necessary to plan and provide additional information for pediatricians and parents about the current view on cryptorchidism and consequences of the late treatment. **Key words:** Cryptorchidism; Orchidopexy; Congenital Abnormalities; Elective Surgical Procedures; Demography; Age Factors; Child

**Introduction**

As reported in literature, undescended testis (UDT) or cryptorchidism is detected in 3% of full-term male newborns, and in up to 33% of preemies [1]. Congenital cryptorchidism may sometimes resolve spontaneously, the descent occurring mostly during first months of life when endogenous testosterone secretion briefly increases. In some reports this period ranges from three to six (or twelve) months of age [2]. At the age of 1 year UDT is found in 1% of boys [1].

**Summary**

**Introduction.** Undescended testis or cryptorchidism is detected in 3% of full-term male newborns, and in up to 33% of preemies. As the testicular descent may sometimes resolve spontaneously during first months of life, cryptorchidism is found in 1% of boys one year old. According to Consensus of Nordic experts in pediatric urology regarding cryptorchidism, the optimal period for surgery is 12-18 months of age. The goal of this study was to identify the age of patients with congenital undescended testis at the time of surgery. **Material and Methods.** A retrospective study included all the cases of cryptorchid patients who had undergone orchidopexy in the period from 2007 to 2014. The patients' age and the place of residence were analyzed. **Results.** A total of 637 patients (722 orchidopexies) underwent the elective operative treatment of undescended testis during the observed period. The analysis revealed that only 144 (22.60%) of cryptorchid infants were operated on within their first 18 months of life. In the group of 359 patients from the urban environment, 101 (28.13%) were operated under the age of 18 months. Among the 278 patients from the rural environment, 43 (15.46%) were 18 months and younger at the time of surgery. **Conclusion.** The timing of surgical treatment of undescended testis in the study period was far from the recommended optimal time. It is evidently necessary to plan and provide additional information for pediatricians and parents about the current view on cryptorchidism and consequences of the late treatment. **Key words:** Cryptorchidism; Orchidopexy; Congenital Abnormalities; Elective Surgical Procedures; Demography; Age Factors; Child
and scrotal orchidopexy. When the testis is non-palpable, laparoscopy plus orchidopexy is the method of therapy. Although pediatrians and parents are aware of the importance of UDT, orchidopexy is not always performed within the recommended period.

The age of boys with UDT at the time of orchidopexy in relation to their urban/rural residence was evaluated in this study.

Material and Methods

Demographic data of the patients subjected to elective orchidopexy in the period from 2007 to 2014 were extracted from the Information System of Pediatric Surgery Department of the Institute for Children and Youth Health Care of Vojvodina in Novi Sad as a tertiary health care institution. The hospital, which renders its service to two and a half million inhabitants living in Vojvodina, can be reached in less than 2 hours from every part. Every settlement in Vojvodina having at least 4000 residents is covered within the primary health care network. All the patients were examined by regional pediatricians before visiting the Pediatric Urology Department.

Emergency surgeries such as incarcerated hernia with descended testes, re-do surgeries and the second stage of orchidopexy were excluded. The patients with bilateral UDT underwent both surgeries at the same time.

All the patients were examined by pediatric urologists and pediatric surgeons. After physical examination, the patients underwent scrotal ultrasound examination in search for any comorbidity (hydroceles, cysts etc.) and testicle volumetry. The patients with bilateral nonpalpable testis underwent the protocol prepared by endocrinologists (hormonal examinations, gonatotropine test, etc). As recommended by Nordic consensus [3] and several medical organizations (European Association of Urology, American Academy of Pediatrics guidelines for the management of cryptorchidism) the surgical treatment has to be finished before the age of 18 months, which was the timing used in our study as well.

Statistical Student's T-test using Microsoft office Excel 2010 system was applied to compare the significance of difference between the urban/rural groups and to measure its significance.

Results

A total of 637 patients (722 orchydopexies) aged from six months to 17 years (mean 5.24), were selected for this study covering the period from 2007 to 2014. No positive trend in the mean age over the years was noticed. There were 542 (85.08%) patients with unilateral orchidopexies and 85 (13.34%) bilateral ones. The right and left sided orchidopexy was performed in 480 (66.48%) and 242 (33.51%) patients, respectively.

Abbreviations
UDT – undescended testis

Graph 1. Age distribution of boys who underwent orchidopexy in the period from 2007 to 2014

The analysis revealed that only 89 (13.97%) patients were operated on before the age of 1 year. In the optimal period within 18 months of age, 144 (22.60%) infants with cryptorchidism underwent orchidopexy. Only 200 (31.39%) infants in our sample underwent surgery within 2 years of age, which is the timing also recommended by some authors.

The highest frequency of orchidopexy was noticed in the first two years of age (89+111=200) (31.39%), and at the time of starting the primary education, i.e. 7 years in Serbia (65) (10.20%). Distribution of patients by age is presented in Graph 1.

Of all the patients, 359 (56.35%) lived in urban settlements and 278 (43.64%) lived in villages. In the group from the urban environment, 101 (28.13%) were under the age of 18 months. In the rural group, 43 (15.46%) were 18 months of age and younger. Student’s test (Microsoft office Excel 2010) revealed a relevant statistical difference between these two groups with p<0.001.

Discussion

According to recent knowledge testicular physiology is marked by the transformation of neonatal gonocytes in the period from 3 to 12 months after birth. In UDT this step is disrupted and if left untreated beyond 2 years of age, there is a chance of spermatogenic failure [6,7]. Changes in testis histology in cryptorchid testes are variable depending on the age of the individual at the time of orchidopexy and the position and duration of cryptorchidism. However, some authors believe that this step may be reversible with surgery in infancy [8]. An early surgery, the optimal period being 12-18 (possibly 24) months of age, has been recommended by many authors and many medical organizations in order to prevent temperature-related damages [9-11]. Consensus is that orchidopexy should be done in a medical centre with pediatric specialists in anaesthesia and surgical procedures [8].
According to recent literature data, orchidopexy is still performed in patients over 1 year of age despite consistent guidelines and convincing evidence of delay-related risks [12–14] and over 2 years of age [15–17]. As presented in a number of published studies, the percentage of orchidopexies done in the optimal period is about 40% or less (Table 1).

Two periods have been identified by some authors as periods of increased number of surgical treatment of cryptorchidism: the first two years of age and school entry age (6-7 years) as it was noticed in our study as well. The latter peak may partly be explained by secondary testicular ascent [8], but we do not have sufficiently accurate data to support this.

It is very important that cryptorchidism can be detected by pediatricians as early as at birth, so we believe that at regular postnatal checkups during the baby’s first months of life pediatricians should pay additional attention to possible spontaneous descent in that period. On any suspicion of an undescended testicle by the age of 6 months the child should be referred to a specialized surgeon for further assessment and follow-up.

The fact that the mean age at orchidopexy is significantly beyond the recommended [5, 14, 18] suggests the need for promoting more awareness among health providers.

Delayed referral of patients with UDT can occur for several reasons. Most often the condition is not identified early enough and in cases when identified, some parents fail to refer their baby timely to a surgeon because they fear surgery or do not understand the importance of appropriate surgical treatment of the condition which is not even accompanied by pain. Some delays are due to misunderstanding of the information given by a doctor that the testicle may descend by itself after the age of 6 months [15, 19]. In our study the available data on the patients’ medical history were insufficient for drawing valid conclusions about the reasons of delay, but the indications are clear that the level of health culture is not satisfactory.

Our main finding is that in the period from 2007 to 2014, the patients’ age at the time of surgical intervention averaged as high as 5.24 years, which indicates the necessity of raising the health awareness of parents; a number of other studies have also stressed the importance of providing additional education, information and regulation on the importance of timely orchidopexy [15, 16, 19–22].

Since the proper function of UDT depends upon the age at which the testicle descends into its normal position, the current evidence-based recommendation is to perform orchidopexy between 12 and 18 (possibly 24) months of age. Our study shows that the percentage of orchidopexies at the optimal period of the first 18 months (22.60%) and the first two years of age (31.39%) was significantly low. Besides, there is a relevant statistical difference between the patients from urban (28.13%) and rural settlements (15.46%) regarding orchidopexy done in the optimal period.

**Conclusion**

In our opinion, better pediatric training is necessary, and parents need appropriate information on the current consensus on treatment of undescended testis and its importance regarding the long-term health consequences. We also propose that the timing of orchidopexy for undescended testis should be regulated with the same programs (as immunization for example) in order to achieve a good result.

**References**


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**Table 1. Published data on the age of patients who underwent orchidopexy**

<table>
<thead>
<tr>
<th>Study</th>
<th>Before age of 1 year Pre prve godine</th>
<th>18 months 18 meseci</th>
<th>Before age of 2 years Pre druge godine</th>
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<tr>
<td>Capello, 2006 [9]</td>
<td>37.8%</td>
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<td>Bruijmen, 2008 [15]</td>
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<td>McCabe, 2008 [16]</td>
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<td>Fouda, 2009 [14]</td>
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<td>Kokorowski, 2010 [18]</td>
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<tr>
<td>Dobanovacki, 2015 [article]</td>
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