The Timing of Elective Surgery on the Genitalia of Male Children With Particular Reference to Undescended Testes and Hypospadias

Several factors influence the proper timing of surgery in children with undescended testes and hypospadias. Among these the most important are psychologic, physiologic, and technical factors.

**PSYCHOLOGIC CONSIDERATION IN CRYPTORCHIDISM AND HYPOSPADIAS**

In determining the optimum time for surgery one must consider the child's general reaction to hospitalization as well as the specific reaction to operation on the genitalia.

Several factors may have a direct or indirect effect on the nature and severity of emotional reactions to surgery. Age is one important factor but other variables include interactions within the family, the coping ability of the child and his family, including the effect of previous traumatic experiences, and the adequacy of the child's preparation for hospitalization, surgery, and follow-up.

**Age**

Specific hazards affect children in various age groups. In general, these hazards may be classified as follows:

1. Birth to 6 months: During this period there should be relatively little concern about brief separation, hospitalization, or the emotional trauma of an operation, but separation should be brief as possible. Awareness of the parents' reaction to the illness and separation is important. Provisions for involving them should be encouraged.

2. Six months to 12 months: The infant now begins to be aware of and increasingly upset by separation from the mother.

3. One year to 3 years: Separation from the mother is traumatic, particularly during the earlier phase of this period. It is important that the mother remain in the hospital or visits regularly. If this is impossible, parent substitutes or surrogates may minimize the psychological trauma.

4. Three years to 6 years: With increasing age, both separation from the mother and preparation for surgery can be more easily accomplished because the child is increasingly able to comprehend the need and nature of the procedure. Despite this, however, he may show evidence of modesty, shame, and anxiety about his genitalia. Fears of mutilation of the genitalia begin to be apparent in some children.

5. Six years and older: During this period, or sometimes at a younger age, the child begins to feel anxiety about operations on the genitalia. This anxiety reaches a maximum at about puberty. Parental involvement and support continues to be important at any age, but separations become easier.

Thus, the most hazardous time psychologically for elective surgery on the genitalia is between the ages of 6 months and 3 years. Conversely, the optimum time is during the first 6 months or during the fourth or fifth year of life, depending on the emotional maturity of the child. Beyond the age of 6, even though the adverse effects of hospitalization and separation tend to diminish, anxiety may be greater.

**Family Situation**

Of the greatest importance in determining the severity of reaction to hospitalization and operation is the family situation. This is also the variable that is most difficult to alter. In families
where the individual members relate well to each other, the child will usually have no problems. The child from families where the individual members do not communicate well and handle feelings poorly, however, is more likely both to manifest anxiety about separation and operation and to have an adverse emotional reaction following surgery.

**Preparation for Hospitalization and Surgery**

One of the factors that can be influenced most by the physician is the child's preparation for his experience in the hospital as a surgical patient. Lack of familiarity with the hospital and uncertainty about what will be done to him may also give rise to insecurity and fear in the child and parents. Diagrams, slides, or even a movie illustrating various aspects of hospitalization and surgery may be helpful. Above all a realistic and honest explanation of what the child and parents should expect, especially after surgery, will do much to forestall postoperative disturbance. Permitting the parents to be with the young child just prior to and during recovery from anesthesia is important in this respect.

**Nature of Operation—Orchiopexy**

Anxiety is commonly manifest after any type of surgical procedure. It is to be expected that operations on the penis and testes will frequently be disturbing experiences because they are intrusions into the child's most private area of the body. This may lead to overt anger and resentment. The results of a study by Cytryn et al. are instructive. They studied the behavior of 19 boys with cryptorchidism before operation and that of 8 after operation. Orchiopexy was performed at various times between the ages of 3 and 14 (mean age, 7 years). Cytryn et al. found that four particularly disturbed boys had been operated on at age 10. They concluded that early operation—during the preschool years—was the most effective in preventing future psychologic problems but that the age period of 1 to 3 was the least opportune time.

There appears to be a direct correlation between the success of the surgery and the child’s feelings. Failure produces double trauma while success is a mitigating factor. Both the child and his parents should be allowed to air their fears of body mutilation. The parents’ attitude and fears are very important in determining the child’s attitude.

**PHYSIOLOGIC CONSIDERATIONS RELATING TO CRYPTORCHIDISM**

Future spermatogenic activity has always been the prime consideration in any decision about the timing of orchiopexy. Even so, conclusions drawn in many articles dealing with the subject are confusing and conflicting. The points of contention are twofold: the extent or frequency of primary dysgenesis and the time at which abnormal histologic changes begin to manifest themselves in the undescended testicle as a result of its abnormal position.

**Primary Dysgenesis**

In cryptorchidism the observed histologic features (e.g., tubules that are smaller than normal, spermatogenesis that is absent or severely reduced, maturation that is retarded) have been said by some to be entirely congenital. These authors are convinced that all undescended testes are abnormal, regardless of the affected individual; their argument is that, histologically, none of the testicles differ whatever the patient’s age. The incidence of primary dysgenesis varies from 20% to 100% in various series.

**Derangement of Normal Structures Produced by Abnormal Environment**

The rapid and deleterious effect of heat upon male germinal epithelium has been proved experimentally. Alterations produced by heat are similar to those associated with congenital deficiency. Confusion comes from studies which reveal that cryptorchid testes do not differ histologically from their descended mates prior to puberty; thus some authors find all cryptorchid testes to be abnormal and some observe no alteration if the biopsy specimens antedate puberty. Depending on the particular report, the critical time during which such changes begin varies from age 4 to age 10. The authors of all reports, however, agree that undescended testes degenerate after puberty. Recent reports indicated that, in cases of unilateral cryptorchidism, spermatogenesis in the undescended testicle may be significantly diminished at about age 1, as compared to spermatogenesis in the scrotal mate. By examining such recent information and by further examining existing knowledge, one comes to realize that the conclusions of many studies have been based on the findings of series in which the youngest patient is 4 years or older and that therefore critical changes in infancy could easily have been missed.
It has, furthermore, been shown that unless the testis reaches the bottom of the scrotum by 1 year, the testis will never spontaneously descend completely. From the foregoing arguments one might hastily conclude that early infancy is a good time when the testis might be biopsied and surgically brought into the scrotum. Such a conclusion can be supported, moreover, by the following observations: (1) Spontaneous descent is unlikely after age 1. (2) Any position other than the bottom of the scrotum risks thermal deterioration of germinal epithelium proven to be heat-sensitive tissue. (3) Cytochemical and histologic changes in the cryptorchid testis have been repeatedly demonstrated to occur early in life, despite the fact that other studies have provided no evidence of change until the maturational phase or late growth phase (age range, 6 to 10).

We therefore believe, after reviewing information that is both current and somewhat older, that patients with cryptorchid testes may be served best by early biopsy and orchiopexy. Nonetheless, the responsibility of proving by subsequent studies the efficacy of such an approach rests upon those who promote early surgical intervention.

Therefore, this Committee feels that such an approach should be carried out by large centers undertaking ongoing studies on this problem. Despite the above, this Committee feels that not enough evidence has been presented to alter the conclusion that the ideal age for orchiopexy is after age 4 and before age 6 unless symptomatic hernia is present. We would suggest a general (mean) target age after the fourth birthday, but such time boundaries naturally will have to be adjusted from child to child, depending on emotional variations.

**TECHNICAL CONSIDERATIONS RELATING TO HYPOSPADIAS**

There are many therapeutic plans for the correction of hypospadias. These vary from single- to multi-stage procedures. All accept the importance of completing the correction in the preschool period. Each surgeon rightly employs the therapeutic plan which has served him best and achieves a good functional and cosmetic result with the least possible complications. Provided that such results are comparable, the method employed should be beyond question.

Since the degree of both chordee and hypospadias varies, no one standard therapeutic plan suffices in all instances.

If the chordee is to be corrected separately, this procedure is usually done when the child is between the ages of 1 and 2. However, an important point in the treatment of hypospadias is the realization that in many cases of glandular or penile hypospadias, the associated chordee is not the result of fibrous tissue but rather of changes in the skin; in such cases incision of the skin may straighten the penis and allow the surgeon to construct the neourethra at the same time.

A reclassification of hypospadias to cover this important principle is in order: (1) glandular or penile, with skin chordee; (2) glandular or penile, with true chordee; (3) scrotal, with chordee; (4) perineal, with chordee.

Severe hypospadias may be an indication of male intersex, a situation that falls into the much broader problem of intersex which is not covered in this report. Nonetheless, the advisability of urethrography and urethroscopy in such instances should be pointed out.

**SUMMARY**

Psychologic considerations suggest that the optimal time for elective surgery on the genitalia is either the first 6 months of life or sometime during the fourth year. In the child with cryptorchidism, physiologic considerations are of paramount importance and the timing of treatment should be based on these considerations. Despite the conflicting views on the subject, there is suggestive evidence that early orchiopexy—during the first year of life or soon afterwards—may be the most optimal time for orchiopexy, but further investigation would be necessary to confirm this. Currently, timing of operation is based more on psychologic rather than physiologic factors (although both are taken into account), and should remain unchanged until further evidence accumulates.

The Committee feels that the later the orchiopexy after age 6, the more likely germinal epithelial failure will occur. However, it should be pointed out that 5 or 6 has not proven to represent optimal age in respect to germinal function but only the latest recommended age for orchiopexy.

In patients with hypospadias, technical considerations have the greatest bearing on timing, but, depending on the individual surgeon, the precise timing varies. The period after the third birthday is preferred by the majority; this certainly is consistent with psychologic considerations unless the correction of chordee justifies a separate pro-
procedure, which then should be corrected by age 2.

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**BIBLIOGRAPHY**

40. Vernon DTA, Foley JM, Sipowicz RR, Schulman JL: The Psychological Responses of Children to Hospi-

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