

Phimosis and urinary tract infection: An Asian perspective

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Abstract

Circumcision, the surgical removal of the prepuce, has originally been performed as a ritual procedure among people of certain religions and ethnicities. There are many studies on whether this procedure has advantageous effects on the prevention of urinary tract infection (UTI), mainly from North America and Australia, where circumcision prevalence is between 20 and 80%. Bacterial colonization in the prepuce is documented in literature and could be a legitimate reason why catheterization, but not the bag urine method, is required for uncontaminated urine collection in infants. Circumcision may, but not definitively, reduce the risk of febrile UTI in boys and breakthrough febrile UTI in males with vesicoureteral reflux (VUR). Despite several studies on this topic, there is no prospective study supporting the role of circumcision in patients with VUR to date. Therefore, the guidelines from the American Urological Association and European Association of Urology identified circumcision as an option for UTI prevention. The situation is different in most Asian countries. In Islamic Asian countries, where circumcision rate is nearly 100%, this issue does not raise any clinical concerns. In contrast, circumcision is performed in less than 20% of the males in non-Islamic Asian countries, except for South Korea and the Philippines. In countries where circumcision is not performed during childhood, it is difficult to be conceived as a therapeutic measure by both parents and physicians. The Asian guideline for UTI or sexually transmitted infection, to be published within a year, would advocate recognizing such diversity as a fundamental condition in considering the implication of circumcision in each country. In the future, development and treatment of febrile UTI (fUTI) among uncircumcised boys in these countries should be further studied in a separate context from the countries where circumcision is prevalent.

Abbreviations

AUA: American Urological Association

bUTI: breakthrough urinary tract infection

EAU/ESPU: European Association of Urology/European Society for Paediatric Urology

fUTI: febrile urinary tract infection

STI: sexually transmitted disease

UTI: urinary tract infection

VUR: vesicoureteral reflux

Summary of recommendations

Bacterial flora exists in the inner prepuce, and physicians should be aware that contamination may occur in non-circumcised boys, and catheterization may be required for uncontaminated urine collection (grade of recommendation B; level of evidence 2).

Circumcision may, but not definitively, reduce the risk of fUTI in males and breakthrough febrile UTI in males with VUR. Circumcision should be considered for uncircumcised boys with febrile UTI and VUR in countries where circumcision is accepted among the general population (grade of recommendation B; level of evidence 2), while, in countries where childhood circumcision is rarely performed, other measures for febrile UTI/VUR should be the preferred choice; however, there is insufficient evidence for this problem to date (grade of recommendation C; level of evidence 4).

1 Introduction

Circumcision, surgical removal of the prepuce, has been performed as a ritual procedure in specific religions and ethnicities, such as Muslim and Jewish people. Many studies have been published to examine whether this originally ritual procedure has an advantageous effect on prevention of urinary tract infection (UTI), especially in male infants with vesicoureteral reflux (VUR). In North America and Australia, where circumcision prevalence is between 20 and 80%, a vital clinical question is whether circumcision should be an option in for treating UTI, and it should be noted that majority of the literature on this topic is from these areas. In contrast, this issue is less frequently mentioned in Asia. In Islamic Asian countries, where the circumcision rate reached nearly 100%, this issue does not raise any clinical problem. In contrast, circumcision is performed in less than 20% of males in non-Islamic Asian countries, except for South Korea and the Philippines (Figure 1) [1]. In countries where neonatal circumcision is routinely performed, no clinical problems may exist in regard to this issue either. In countries where circumcision is not performed during childhood, it is difficult to be conceived as a therapeutic measure by both parents and physicians. In such sense, debates on circumcision arise exclusively from countries where this procedure is performed for some, but not all, male infants.

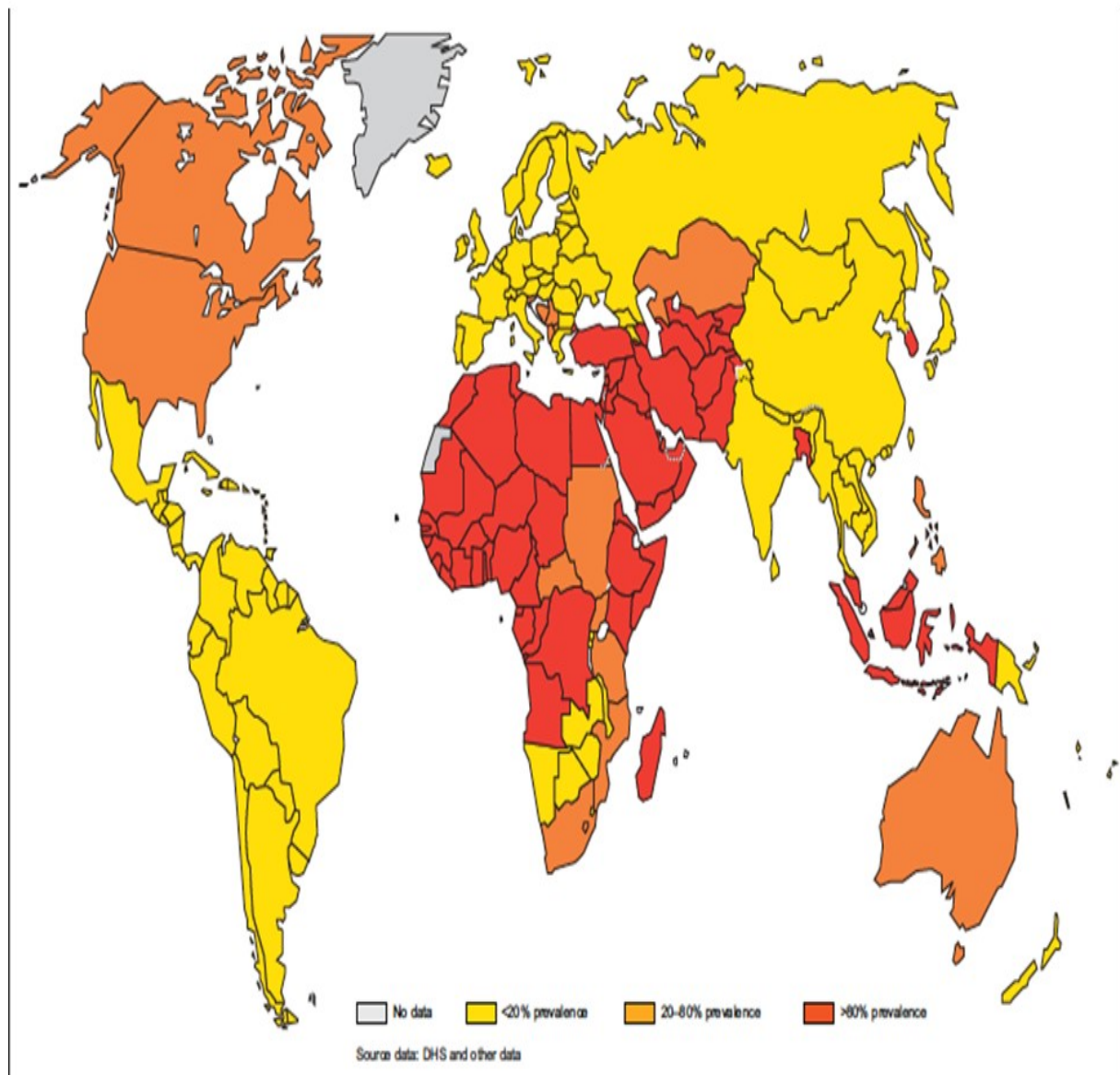


Figure 1: The map shows the distribution of circumcised boys. In Muslim countries, Israel and South Korea, the circumcision rate is >80%. The rate is 20–80% in North America, Australia, the Philippines, and the Balkan countries. In Middle and South America and majority of Europe and non-Islamic Asian countries the rate is <20%. (Reprinted from literature with permission by WHO [1], © World Health Organization and Joint United Nations Programme on HIV/AIDS, 2007)

Because of such radically different socio-ethnic backgrounds in the world, conclusion drawn from studies on one country or ethnicity cannot be equally applied to every other country. At the same time, there are few studies focusing on this topic from Asian and European countries, where circumcision is not frequently performed.

2 Methods

Due to absence of medical literature from countries where circumcision is not frequently performed, the evidence provided in this chapter are inevitably based on literature from countries where circumcision is

accepted. The main aim of this chapter was to discuss the applicability of such evidence to Asian populations in a sociocultural context, as described above.

For this purpose, we conducted a PubMed search using a combination of the keywords, “circumcision,” “prepuce,” “urinary tract infection,” “vesicoureteral reflux,” and “children.” The studies were classified into 3 topics:

1. preputial bacterial flora,
2. UTI, and
3. VUR.

Application of these evidences on guidelines in different countries and regions is also discussed.

3 Results

3.1 Preputial bacterial flora and diagnosis of febrile UTI (fUTI) in boys

Colonization of bacteria in the inner prepuce and reduced colonization following circumcision has been documented in studies from the United Kingdom [2], Turkey [3], [4], [5], Israel [6], Ireland [7], and the United States [8]. However, there was one study that reported no difference in bacterial culture between circumcised and uncircumcised males [9] and another study that documented just a modest difference, 37% vs. 28% detection of uropathogenic bacteria, between non-circumcised and circumcised patients with VUR under antibacterial prophylaxis [10]. There are no studies from Asian countries.

Bacterial colonization should be the reason why bag-collected urine from uncircumcised boys produce positive urine culture. This aspect is primarily important in the accuracy of diagnosis of UTI by urine specimen [11]. The American Academy of Pediatrics advocates in its guideline that urine specimen should not be collected by bags but through catheterization [12]. Moreover, it should be noted that the majority of large-scale epidemiological studies related to UTI and circumcision does not specify whether urine specimens were collected by bag or by catheter.

3.2 Circumcision in boys with fUTI

Regarding the prevalence of UTI, there is one prospective randomized study demonstrating the reduction in episode of symptomatic fUTI, but it was not statistically significant [13]. Besides, there have been numerous non-randomized studies reporting decreased fUTI rate in circumcised boys compared with that in non-circumcised boys: cohort studies from Canada [14], Australia [15], and the United States [16], [17], [18] and a series of epidemiological studies from the United States [19], [20], [21], [22]. Three meta-analyses compiling these non-randomized studies were published: two from the United States [22], [23] and one from Australia [24]. There were also two studies comparing the incidences of fUTI before and after circumcision: one from Turkey [25] and one from the United States [26]. However, there are a few studies from areas of Europe and Asia where circumcision is not prevalent.

3.3 Circumcision in boys with VUR

There is no prospective study for the role of circumcision in patients with VUR. One cohort study revealed that, among boys with VUR detected in prenatal hydronephrosis, a higher rate of breakthrough UTI (bUTI) was noted in non-circumcised boys (53%) than circumcised boys (19%) [27]. Another study reported a reduced rate of bUTI after circumcision from 45.2% to 6.2% [28]. There is one report from Japan on the incidence of bUTI during prophylaxis in the non-circumcised population [29]. In comparison to the two reports [27], [28], the percentage of 32.2% of bUTI [29] is lower than the reported percentage

in non-circumcised groups but higher than that in circumcised groups. There is another report from Korea on the effect of concomitant circumcision during anti-reflux surgery, which seems not to affect the clinical course [30].

Based on these studies, we may conclude that circumcision reduced the risk of fUTI in males to some extent.

3.4 Guidelines

Circumcision is described as a therapeutic choice for VUR in the American Urological Association guideline of 2010. In the United States, where circumcision rate varies among races but ranges from around 70 to 80% in total, this choice should be presented to parents. The guideline states that, "Although there are insufficient data to evaluate the degree of this increased risk and its duration, parents need to be made aware of this association to permit informed decision-making" [31]. In Europe, the prevalence of circumcision is radically different between countries. Israel and Turkey are at one extreme with nearly 100% prevalence, but majority of countries have less than 20%. In such context, the European Association of Urology/European Society for Paediatric Urology guideline advocates that "Circumcision during early infancy may be considered part of the conservative approach because the procedure has been shown to be effective in reducing the risk of infection in normal children" [32]. Asia has a similar diversity, Muslim Asia and non-Muslim Asia are sharply divided in circumcision prevalence, with exception of South Korea and the Philippines. The Asian guideline for UTI or sexually transmitted infection to be published within a year would advocate recognizing such diversity as a fundamental condition in considering the implication of circumcision in each country.

4 Further research

In countries where neonatal circumcision is routinely performed, no clinical problems may exist in regard to this issue. In countries like Korea and the Philippines where circumcision is performed during childhood, but not as a routine procedure in neonates, one may adopt the conclusions similar to that in the United States and may have the obligation to present circumcision as a choice of treatment in male infants with fUTI and/or VUR.

In countries where circumcision is not routinely performed for children, this procedure may have quite limited role as a treatment for VUR. The natural history of the prepuce was reported in Japan and clearly designated that evolutionary history has created human glans to be exposed spontaneously during puberty in almost every man [33]. A Japanese opinion leader, Kenji Shimada, presented his view on this issue stating that "Instead of talking about the negative effect of the prepuce, we have to take lessons from history and reconsider its positive significance" [34]. The word "history" may indicate biological natural history here. Upon such view, in countries where circumcision is not performed during childhood it is difficult to be conceived as a therapeutic measure by both parents and physicians. If the prepuce could be a source of infection, could it be solved by retractability of the prepuce or is it the presence of the prepuce itself that matters? Such questions deserve further clinical studies in the future.

5 Conclusions

In countries where circumcision is not considered a clinical choice, the association between the prepuce and UTI in men should be reconsidered in a separate context from the literature from countries where circumcision is prevalent. Since there is diversity in the world, there is diversity in clinical practices, as well.

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