Sports and the solitary kidney: what parents of a young child with a solitary kidney should know

Karen Psooy, MD

Can Urol Assoc J 2009;3(1):67-8

Background and objectives

The American Academy of Pediatrics (AAP) provides recommendations regarding sports in the child with a solitary kidney.[1] They suggest that no restrictions be placed on noncontact sports, and that clinical judgement be used regarding placing any restrictions on contact/collision and noncontact sports — Grade of Recommendation: B (International Consultation on Urological Diseases [ICUD] system).

These guidelines were developed in accordance with the recommendations of the AAP, tailoring them to the young, sports-naïve child. As per the recommendations, a literature search was carried out to determine what evidence is available on the risks of injury to the pediatric kidney through sports and whether these risks might be lowered. A detailed explanation of this literature search and conclusions are available in the *Canadian Journal of Urology*, June 2006.[2]

In accordance with the AAP recommendations, the following information should be conveyed to the parent of a young child with a solitary kidney. Supporting documentation is provided following each statement with level of evidence based on the ICUD system.

Parents of a young child with a solitary kidney should be informed of the following:

1. Their child has only one kidney, and loss of that kidney would result in the need for dialysis or a renal transplant
   Evidence: Indisputable
2. Renal injury, of any etiology, increases the risk/degree of renal insufficiency
   Evidence – Level 3: Children with a normal solitary kidney in childhood have an increased risk of renal insufficiency as an adult.[3,4]
   Evidence – Level 3: Trauma results in a decline of renal function on DMSA renal scan.[5]
3. While renal injury can result from contact/collision or limited contact sports, the risks are less than the risk of head injury
   Evidence – Level 3: Those sporting activities most associated with high-grade renal trauma (bicycling, sledding, downhill skiing, snowboarding and equestrian), have more than a 5 × relative risk of head injury compared to renal injury.[2]
4. Parents should try to keep things in perspective: If they are not going to restrict a child from an activity based on the child having only one "head," then they should not restrict the child from that activity based on having only one kidney
   Evidence – Level 3: Those activities most associated with high-grade renal trauma (bicycling, sledding, downhill skiing, snow boarding and equestrian), have more than a 5 × relative risk of head injury compared to renal injury.[2]
5. Wearing protective padding during contact/collision and limited contact sports may decrease the risk of renal injury
   Evidence – Level 4: Although protective padding is available, there is no evidence to prove they prevent renal injuries.[2]
6. The exact risk of renal injury from each sport is unknown; however, according to available studies, bicycling, sledding, downhill skiing/snowboarding and horse-related activities may carry a higher risk than other activities
   Evidence – Level 3: Review of nine recently published articles (2000–2005) reporting on pediatric renal trauma in North America shows that bicycling, sledding, downhill skiing, snowboarding and equestrian sports are implicated as the most common sports-related causes of high-grade renal trauma.[2]

- Bicycle riding may be made safer for the child by proper maintenance of the bicycle and handlebars

  Evidence – Level 3: Minor bicycle crashes can result in serious handle-bar associated injuries.[6]

  Evidence – Level 4: As falling onto bicycle handlebars results in renal trauma, it is assumed, but not proven, that proper maintenance of the bicycle and handlebars would help prevent renal injuries.[6]
- Sledding and horse-related activities should be done in a safe manner, ideally with supervision

  Evidence – Level 4: Most serious sledding injuries occur when sledding is done near or on roadways, when being towed by a motorized vehicle, or when a stationary object is hit. Therefore it is assumed, but not proven, that renal injuries are less likely if sledding is limiting to noncrowded, designated hills, ideally with parental supervision.[7]

  Evidence – Level 4: It is assumed, but not proven, that horse-related injuries might be prevented if horses and activities are properly matched to the child's capabilities, children avoid standing in positions where they might be kicked, and there is parental supervision.[8]
- Downhill skiing may be safer than snowboarding. Lessons for beginners, especially snowboarders, are encouraged. Good quality, properly fitted equipment decreases risk of injury when downhill skiing

  Evidence – Level 3: When compared, abdominal injuries were significantly higher in snowboarders than alpine skiers (all ages).[9]

  Evidence – Level 4: As snowboard injuries are most likely to occur in beginners, lessons are recommended.[9] Low skill is associated with overall injuries in young skiers, suggesting the value of lessons.[10]

  Evidence – Level 4: Rented equipment and ill-adjusted bindings are associated with more injuries overall in young skiers.[10]

7. Renal injuries from motor vehicle accidents (MVAs) are much more common than injuries from sports activities. Therefore, your child should always be in appropriate car restraints and be taught pedestrian and bicycle road safety

   Evidence – Level 3: Review of seven recently published articles (2000–2005), reporting all grades of pediatric renal trauma in North America, shows that MVAs (including passenger and pedestrian) result in more renal trauma than sporting activities.[2]

From the Division of Pediatric Urology, Winnipeg Children's Hospital, Winnipeg, Man.

This article has been peer reviewed.

Competing interests: None declared.

References

1. American Academy of Pediatrics Committee on Sports Medicine and Fitness. Medical conditions affecting sports participation. *Pediatrics* 2001;107:1205-9.
2. Psooy K. Sports and the solitary kidney: how to counsel parents. *Can J Urol* 2006; 13:3034-40.
3. Argueso LR, Ritchey ML, Boyle ET Jr, et al. Prognosis of patients with unilateral renal agenesis. *Pediatr Nephrol* 1992;6:412-6.
4. Argueso LR, Ritchie ML, Boyle ET Jr, et al. Prognosis of children with solitary kidney after unilateral nephrectomy. *J Urol* 1992;148:747-51.
5. Keller MS, Coln CE, Garza JJ, et al. Functional outcome of nonoperateively managed renal injuries in children. *J Trauma* 2004;57:108-10.
6. Winston FK, Shaw KN, Kreshak AA, et al. Hidden spears: handlebars as injury hazards to children. *Pediatrics* 1998;102:596-601.
7. Shorter NA, Mooney DP, Harmon BJ. Childhood sledding injuries. *Am J Emerg Med* 1999;17:32-4.
8. Jagodzinski T, DeMuri GP. Horse-related injuries in children: a review. *WMJ* 2005; 104:50-4.
9. Machida T, Hanazaki K, Ishizaka K, et al. Snowboarding injuries of the abdomen: comparison with skiing injuries. *Injury* 1999;30:47-9.
10. Goulet C, Regnier G, Grimard G, et al. Risk factors associated with alpine skiing injuries in children: a case-control study. *Am J Sports Med* 1999;27:644-50.

Correspondence: Dr. Karen Psooy, University of Manitoba, GE446 - 820 Sherbrook St., Winnipeg MB R3A 1R9; kpsooy@hsc.mb.ca