

The double-edged blade of recreational hockey

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In this issue, Sanita Atwal and colleagues¹ report the results of the Hockey Heart Study (page 303), in which 113 men over 35 years of age who played recreational hockey in a “gentlemen’s league” in Sydney, NS, were fitted with holter monitors for one game each between January and March 2000. This study posed an important public health question: What is the safety of vigorous sports played by middle-aged and older adults? The results indicated that during recreational hockey it is not unusual for men to exceed the age-calculated target exercise heart rate, defined as 85% of the maximum age-predicted heart rate.

The clinical importance of this observation is not clear, however. The equation used to estimate maximum heart rate ($HR_{\max} = 220 - \text{age in years}$)² represents an average across a population and does not necessarily apply to a given individual. The standard deviation of HR_{\max} , controlled for age, is substantial, at approximately 10 beats/min, which implies that HR_{\max} for many healthy subjects is meaningfully different on a clinical basis from the predicted value. Furthermore, a recent study has clearly shown that this equation systematically underestimates true HR_{\max} among healthy middle-aged and older adults.² Because hockey is primarily an anaerobic sport, involving multiple short sprints, rather than a prolonged aerobic activity, such as jogging or stair-climbing, the response of the heart rate to this type of exercise is expected to be more sustained than is the case for purely aerobic activities.

An interesting aspect of the study by Atwal and colleagues is the reported level of cardiovascular risk factors. More than half of the study participants had elevated total cholesterol, 12.6% had elevated low-density-lipoprotein (LDL) cholesterol, 17.9% had elevated triglycerides, and 24.6% had low high-density-lipoprotein (HDL) cholesterol. These data indicate that many of the men had not received adequate primary prevention, independent of whether or not they intended to participate in vigorous sports. They also indicate that more public health awareness is needed within this demographic group with regard to the importance of seeing a physician regularly as part of a health maintenance and prevention routine. Appropriate primary prevention would reduce the absolute risk of an acute cardiovascular event during recreational hockey.

Previous studies have documented that intense physical exertion rarely triggers acute cardiovascular events.^{3,4} Al-

though discrete episodes of vigorous exertion may transiently increase the risk of an acute cardiovascular event, even among fit individuals, the absolute risk associated with each episode of exercise is extremely low. A recent study estimated this risk as approximately 1 excess cardiac death per 1.5 million hours of exercise in a group of men at low to moderate risk.⁴

To put the risk into context, consider a person who exercises daily for approximately 1 hour. On the basis of previously published data,³ the risk of myocardial infarction associated with each episode of vigorous exertion undertaken by this active person is approximately doubled compared with the risk in time periods during which he or she is at rest. However, regular exercise has been reported to reduce the long-term baseline risk of cardiovascular events by approximately 50%.⁵ Thus, during the 1-hour period of exercise, the person’s risk doubles, but it reaches only the level that it would have been at all times if he or she had chosen to be sedentary. Over the remaining 23 hours of the day, his or her risk is 50% lower. Thus, there is a clear net benefit of regular exercise despite the transient increase in the risk of triggering a cardiovascular event.

Some of the protective effects of regular exercise include lower myocardial oxygen demands at rest and at any given submaximal work load, weight loss, reduced stores of body fat, lower blood pressure including lower peak systolic pressure in response to a given workload, lower levels of triglycerides and LDL cholesterol, and higher levels of HDL cholesterol. In addition, exercise training has been associated with decreased vulnerability to dysrhythmias and relative protection from ventricular fibrillation.⁶ Therefore, physicians, in following pre-participation screening guidelines,^{7,8} should advocate that all adults participate regularly in an exercise of their choice that they find enjoyable and are likely to continue on a long-term basis.

The risk of an acute cardiovascular event is highest for men or women who are sedentary throughout the year and then play hockey competitively once per week during the hockey season. For example, in the Onset Study, the risk of myocardial infarction triggered by vigorous exertion was approximately 50 times higher among sedentary people than among people who exercised almost daily.³

In summary, the most important message for men and women interested in participating in vigorous sports, in-

cluding recreational hockey, is that they should exercise regularly throughout the year and avoid jumping on the ice without any preseason preparation. Regular exercise and adherence to current guidelines for the primary prevention of cardiovascular disease, including the control of dyslipidemia, will reduce the already small risk of an acute cardiovascular event during a hockey game. More important, staying fit and controlling other risk factors will reduce the risk of cardiovascular disease at all times of the year.

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Reducing the risk of allogeneic blood transfusion

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The restricted use of allogeneic blood transfusions has been accepted throughout the world as important in reducing risk, particularly of the transmission of infectious diseases.¹ In orthopedic surgery reduced use of allogeneic transfusions has been shown to prevent both early² and late³ postoperative infection.

In this issue (page 310) Brian Feagan and colleagues describe transfusion practices and blood conservation strategies used in 19 hospitals across Canada for patients undergoing elective total hip or knee arthroplasty during 1998/99.⁴ Of the 4535 patients whose charts they reviewed, 18.6% (range 1.3%–66.0%) pre-donated blood before their procedure, even though 57.9% were eligible to do so. Not surprisingly, the rate of allogeneic transfusions was much lower among those who pre-donated their blood than among those who did not (14.1% v. 30.6%).

Although the rate of autologous blood donation was higher than that in a similar study by the authors in 1995/96,⁵ it is striking that other methods for avoiding allogeneic transfusions are still being used infrequently. In only 2.4% of the cases in the current study were alternative blood conservation techniques such as normovolemic he-

modilution and intra- and postoperative red blood cell salvage used.

As others have shown, including Feagan and coauthors, it is possible with autologous pre-donation alone to reduce dramatically the need for allogeneic transfusions.^{4,6-8} In other countries, various blood conservation programs are in use, and studies have shown that autologous donation, intraoperative blood salvage and postoperative blood salvage, alone or in combination, have reduced the rate of allogeneic transfusion to as low as 8%.^{3,9-23} Table 1 summarizes the allogeneic transfusion rates of studies in which various combinations of blood conservation techniques were used.²⁴

With intraoperative blood salvage, uncoagulated blood is aspirated during surgery and collected in a bag connected to the inferior edge of the surgical wound and then into a reservoir. If the hemoglobin concentration falls by more than 20 g/L (or less if the risk of allogeneic transfusion is high, as in cases of pre-existing anemia or cardiovascular disease, for example) the red blood cells are concentrated, washed and reinfused with the use of an autotransfusion device (e.g., the Dideco Compact Advanced, Dideco S.p.A.,