

VENOUS THROMBOEMBOLISM IN YOUNG SPORTSMEN – WHO IS AT RISK AND WHO IS RESPONSIBLE?

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Regular sport activities decrease the risk of venous thrombosis as was proved in the population-based case-control study by van Stralen et al. A participation in sport activities reduces the risk of VTE compared to others doing no sport (OR 0.64; 95% CI 0.58-0.71) regardless of the differences in risks for various frequencies, intensities, and types of sport.

But sport activities may lead in certain cases to cause VTE with potential fatal consequences.

Hypercoagulability might be achieved by excessive perspiration without the adequate liquid supply, restriction of liquids or abuse of diuretics in order to „drawing“ muscles, polyglobulia due to training in high altitude or abuse of erythropoietin, using of contraceptives, abuse of anabolic steroids, former unknown inherited thrombophilia or malignancy. Travelling, wearing tight footwear or clothes, excessive abdominal press in bodybuilding participate in the stasis of blood. Damage of venous wall is daily problem in the collisional and contact sports. Prevention of VTE of a sportsman requires an acceptance of his priorities and goals by sports doctors. On the other hand, a sportsman, his coach and manager have to be well educated not only in medical prevention but also in nonmedical measures. The sportsman performing the sport at the high level or an enthusiast may be attacked by psychological press, high expectations, responsibility, doping and drugs. Principles of prevention of VTE in sportsmen: 1. be knowledgeable in signs of VTE, 2. adequate liquid supply, 3. don't use diuretics in order to „drawing“ muscles, 4. don't use anabolic steroids, 5. don't use of doping, 6. be wakeful in using of contraceptives, 7. consider of screening inherited thrombophilia (genetic tests) in sportsmen, 8. consistent prevention of traveler's thrombosis, 9. be wakeful in case of trauma. In the end of the presentation we present case report of student of Faculty of Physical Education and Sports, Alpine Ski of World Cup.

Key words: Venous Thromboembolism, Sport, Prevention

INTRODUCTION

Sport is an activity recommended by physicians in the prevention of venous thromboembolism (VTE) thanks to desirable rhythmical motions in talocrural ankle with working calf muscles. There is also an evidence for a reduction of acute phase reaction proteins (including C-reactive protein) due to regular exercise suggesting a suppression of the inflammatory response through the training.

Regular sport activities decrease the risk of venous thrombosis as was proved in the population-based case-control study by van Stralen et al. A participation in sport activities reduces the risk of VTE compared to others doing no sport (OR 0.64; 95% CI 0.58-0.71) regardless of the differences in risks for various frequencies, intensities, and types of sport.

But sport activities may lead in certain cases to cause VTE with potential fatal consequences.

POTENTIAL RISK FACTORS OF VTE IN SPORTSMEN

Sport activities pose potentially risk of VTE and may lead to enforcing Virchow triad. Virchow's triad describes the three categories of factors that are thought to contribute to thrombosis: hypercoagulability, hemodynamic changes and endothelial injury/dysfunction. Triad was proposed by the German physician Rudolf Virchow (1821-1902) in 1856.

Hypercoagulability might be achieved by excessive perspiration without the adequate liquid supply. Extremely dangerous seems to be restriction of liquids or abuse of diuretics in order to „drawing“ muscles.

Very usual method for increasing of red cells number (polyglobulia) due to training in high altitude. Artificial method is blood transfusion or abuse of erythropoietin. The use of erythropoietin was banned by International Olympic Committee in 1990.

The use of oral contraceptives is the most often cause of VTE in young women. Using of contraceptives increases the risk of VTE 4.2-fold by oral contraceptives. Women who use transdermal patches or vaginal rings for contraception have a 7.9 and 6.5 times increased risk of confirmed venous thrombosis compared with non-users of hormonal contraception of the same age.

Administration of anabolic steroids to healthy young men was associated with a significant increase in select blood coagulation factors and plasminogen. These changes create a state of potential hypercoagulability former unknown inherited thrombophilia.

Cancer is leading cause of death in young adults after injuries, suicides, and murders. This age group is not involved in large screening programs, and paraneoplastic thrombosis might be the first sign of until unknown malignant disease.

The stasis of blood might be achieved due to travelling, wearing tight footwear or clothes, excessive abdominal press in bodybuilding. The travelling is inseparable from sports. We travel for training and for competitions around the world.

Damage of venous wall is daily problem in the collisional and contact sports.

CASE REPORT

We would like to present story of 25-years old man. He was a student of Faculty of Physical Education and Sports and at the same time Alpine Ski of World Cup. He suffered a knee injury during race in Alpine skiing on 25th March. He underwent surgery and after surgery he received preventive doses of low molecular weight heparins 3 weeks. 10th Mai suddenly he suffered from breathlessness (dyspnoe) and CT-angiography confirmed emboli in both of branches arteria pulmonalis. So he started to be treated by therapeutic doses of low molecular weight heparins. Color duplex sonography proved thrombosis of vena poplitea lateris sinistri. Malignancy was excluded by detailed oncological screening. Genetic tests confirm only non-significant mutations MTHFR A1298C – heterozygote, MTHFR C677T – heterozygote. Treatment was planned for one year and now there is important task - management of recurrence prevention in this patient.

Currently our patient acts as a junior ski team coach. The accent of management is now on non medical measures. Given that he travels a lot with his team proper prevention of travellers' thrombosis inevitable (preventive stockings, liquid supply, preventive doses of low molecular weight heparins, special foot exercises during the flight. In perioperative period (patient needed correction orthopaedic operation) we applied proper medical prevention – higher doses of low molecular weight heparins. As a coach of junior ski team, he educates young sportsmen in prevention of VTE.

RECOMMENDATIONS FOR PRAXIS

The sportsman performing the sport at the high level or an enthusiast may be attacked by psychological press, high expectations, responsibility, doping, money and drugs. Both, prevention and treatment of VTE of a sportsman requires an acceptance of his priorities and goals by a physician. On the other hand, a sportsman, his coach and manager have to be well educated not only in medical prevention but also in nonmedical measures.

Principles of prevention of VTE in sportsmen:

- Be knowledgeable in signs of VTE
- Adequate liquid supply
- Don't use diuretics in order to „drawing“ muscles
- Don't use anabolic steroids
- Don't use of doping
- Be wakeful in using of contraceptives
- Consider of screening inherited thrombophilia (genetic tests) in sportsmen
- Consistent prevention of travellers' thrombosis
- Be wakeful in case of trauma

Prevention of VTE of a sportsman requires an acceptance of his priorities and goals by sports physicians. On the other hand, a sportsman, his coach and manager have to be well educated not only in medical prevention but also in nonmedical measures. The sportsman performing the sport at the high level or an enthusiast may be attacked by psychological press, high expectations, responsibility, doping and drugs.

Patients among sportsmen await new more safe oral anticoagulation therapy with impatience – a direct inhibitor of factor Xa and direct thrombin inhibitors.

CONCLUSION

The pathogenesis of venous thromboembolism is multifactorial. All risk factors, either congenital or acquired, are relatively “innocent” when considered alone. However, when an individual is unlucky enough to inherit one or more abnormality, compounded in many cases by environmental hazards, that person may be propelled over a threshold that precipitates the development of thrombosis. A varied combination of risk factors in sportsmen can jeopardize not only life and health of individual, but also meaning of life of sportsman and sports team.

Nearly three-quarters (74%) of adults are little or not at all informed about deep vein thrombosis, according to a survey the American Public Health Association. Lack of information may lead to underestimation of risk of VTE. It seems that education plays crucial role in prevention of VTE of sportsmen.

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