



Intravenous Infusions and/or Injections

1. Introduction

Intravenous (IV) infusions have been included on the WADA List of Prohibited Substances and Methods under section M2. Prohibited Methods, Chemical and Physical Manipulation since 2005. They are prohibited both in- and out-of-competition.

The current wording in the 2015 Prohibited List states that *Intravenous infusions and/or injections of more than 50 mL per 6 hour period are prohibited except for those legitimately received in the course of hospital admissions, surgical procedures or clinical investigations (1).*

The wording in the Prohibited List for IV infusions is unique in that the method is not prohibited under the three exceptions as stated above. However, even if there may be no requirement for a TUE for the intravenous infusion as a method, for any prohibited substance (whether in- or out-of-competition) that is administered via IV infusion, a TUE must be requested for the Prohibited Substance.

IV infusions are included on the Prohibited List mainly because some athletes could use this Prohibited Method to:

- a) increase their plasma volume levels;
- b) mask the use of a Prohibited Substance;
- c) distort the values of their Athlete Biological Passport.

In sports with weight classifications, athletes may be encouraged to undertake significant, accelerated weight loss to qualify for a competition and then use IV infusion to rapidly rehydrate. This practice invokes issues of athlete health and safety.

An IV infusion or injection is the supply of fluid and/or prescribed medication by means of a syringe or "butterfly" needle, directly into a vein.

Infusions or injections of 50 mL or less per a 6-hour period are permitted unless the infused/injected substance is on the Prohibited List.

Infusions or injections of more than 50 mL per a 6-hour period are prohibited unless the infused/injected substance is administered during a hospital admission, surgical procedure or clinical investigation. Please consult the tables/

figures in the Appendix for more details on the principles and examples of when IV infusion/injections of certain substances are permitted or prohibited.

If a non-prohibited substance is infused or injected without a concurrent hospital admission, surgical procedure or clinical investigation, a TUE must be submitted for this Prohibited Method if more than 50 mL of fluid per a 6-hour period is infused or injected.

If a Prohibited Substance is administered via IV infusion or injection a TUE application must be submitted for the Prohibited Substance regardless of whether the infusion is less than 50 mL or the setting/circumstances under which it is administered. In situations of medical emergency or clinical time constraints, a retroactive TUE application is acceptable (ISTUE article 4.3).

2. Diagnosis

A. Medical history

A summary of the athlete's history and the findings of a physical examination should confirm the diagnosis and establish the need for an IV infusion. A **precise** description of the clinical situation and specific medical indication for the IV infusion must be given in the TUE application.

Note that if an IV infusion or injection is part of a clinical investigation, surgical procedure or hospital admission, there is no requirement for a TUE. The athlete is nevertheless advised to obtain and keep a copy of the medical records from the intervention or procedure.

B. Diagnostic criteria

A clearly defined diagnosis should be established in accordance with the International Classification of Diseases standards of the World Health Organization (ICD-10).

C. Relevant medical information

A detailed description of the substance to be infused, the rate of infusion and any other relevant clinical information from the treating physician should be included. It must be demonstrated why an alternative permitted therapy, for example oral rehydration in case of dehydration, is not a valid option. Any existing co-morbidities that would influence the decision for granting a TUE should also be included.

3. Medical best practice treatment

Legitimate medical indications for IV infusions are well documented and are most commonly associated with either medical emergencies or in-patient care.

When an IV infusion is administered to an athlete, the following criteria should be fulfilled:

1. A clearly defined diagnosis.
2. Supportive evidence that no permitted alternative treatment can be used.
3. The treatment has been ordered by a physician and administered by qualified medical personnel in an appropriate medical setting.
4. Adequate medical records of the treatment.

The use of IV infusions in sport is commonly linked with rehydration after exhaustive effort, and this situation is arguably the major cause of debate. It must be understood that the use of IV fluid replacement following exercise to correct mild to moderate dehydration is not clinically indicated nor substantiated by the medical literature. There is a well-established body of scientific evidence to confirm that oral rehydration is the preferred therapeutic choice, potentially even more effective than IV infusion.

(Ref: 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16)

A. Name of Prohibited Method

IV infusion or injection of >50 mL per a 6-hour period unless legitimately received in the course of hospital admissions, surgical procedures or clinical investigations.

B. Recommended Duration

Dependent on diagnosis and on the particular clinical situation, but if the infusion is a single intervention, the TUE should be valid for a relatively short duration.

4. Other non-prohibited alternative treatments

Oral rehydration or oral delivery of medication.

5. Consequences to health if treatment is withheld

These will be dependent on the clinical situation. However, in case of a medical emergency, a possible consequence of withholding treatment could result in serious harm to the health or even death. Therefore, the health and well-being of the athlete must always remain the priority.

6. Treatment monitoring

Continuous evaluation by treating physician or someone acting on his/her behalf until the desired treatment effect has been achieved.

7. TUE validity and recommended review process

The duration of the TUE is usually for a short time period surrounding the initial medical intervention. Longer usage of an IV infusion would typically occur in a hospital setting and therefore does not require a TUE.

8. Any appropriate cautionary matters

It is the responsibility of the treating physician to evaluate the clinical indication for an IV infusion or injection and the subsequent need for a TUE application.

At all times, the health and well-being of the athlete must remain the priority during medical investigations and treatments. TUECs should apply sound clinical judgment to their interpretation of the ISTUE, but be mindful of the inappropriate use of IV infusion in non-emergency situations where alternative permitted and evidence-based alternatives exist.

9. References

1. WADA Prohibited List, WADA website
2. Vandebos F., et al: Relevance and complications of intravenous infusion at the emergency unit at Nice University Hospital.
J. of Infection 46 (3): 173-6, 2006
3. Arbitral Award, CAS 2002/A/389-393
4. Arbitral Award, CAS2006/A/1102 & 1146
5. ASOIF Medical Consultative Group: Minutes of the meeting 7th May 2006
6. Canadian Academy of Sports Medicine: A brief overview about intravenous hydration in athletics, Casa DJ, Maresh Cm, Armstrong LE et al Intravenous versus oral rehydration during a brief period: responses to subsequent exercise in the heat.
Medicine and Science in Sports and Exercise 2000 Jan; 32(1): 124-133
7. Webster S, Rutt R, Weltmann, A
Physiological effects of a weight loss regimen practiced by college wrestler
8. Naghii, MR
The Significance of Water in Sport and Weight Control
Nutrition and Health, 2000, Vol. 14, pp. 127-132
9. Sawka, MN
Physiological consequences of hypohydration: exercise performance and thermoregulation
Medicine and Science in Sports and Exercise 0195-9131/92/2406, Vol. 24, No, 6
10. Maresh CM, Herrera-Soto JA, Armstrong LE, et al.
Perceptual responses in the heat after intravenous versus oral rehydration
Medicine and Science in Sports and Exercise. 2001 jun; 33(6) 1039-1045
11. Castellani JW, Maresh CM, Armstrong LE, et al
Endocrine responses during exercise-heat stress: effects of prior isotonic and hypotonic intravenous rehydration.
European J Appl Physiol Occup Physiol. 1998 Feb; 77(3): 242-248.
12. Kraemer WJ, Fry AC, Rubin MR, Triplett-McBride T, et al
Physiology and performance responses to tournament wrestling
Medicine and Science in Sports and Exercise 0195-9131/01/3308-1367
13. Mudambo SM, Reynolds N
Body fluid shifts in soldiers after a jogging/walking exercise in the heat
Central African Journal of Medicine 2001 Sept-Oct; 47(99-10), 220-225

14. Landers DM, Arent SM, Lutz RS
Affect and cognitive performance in high school wrestlers undergoing rapid weight loss
Journal of Sport and Exercise Psychology 2001, 23, 307-316.
15. Riebe D, Maresh CM, Armstrong LE, Kenefick RW, et al
Effects of oral and intravenous rehydration on ratings of perceived exertion and thirst
Medicine and Science in Sports and Exercise 1997 Jan (1): 117-124
16. Noakes TD, Walsh RM, Hawley JA, Dennis SC
Impaired high-intensity cycling performance time at low levels of dehydration
International Journal of Sports Medicine 15 (1994) 392-398.
17. Rogers, Ian R.; Hook, Ginger. Stuempfle; Kristin J; Hoffman Martin D.; Hew-Butler, Tamara,
An Intervention Study of Oral Versus Intravenous Hypertonic Saline Administration in Ultramarathon Runners with Exercise-Associated Hyponatremia: A Preliminary Randomized Trial
Clin J Sport Med _ Volume 21, Number 3, May 2011
18. Casa, Douglas J, Ganio, Matthew S; Lopez, Rebecca M; McDermott, Brendon P.; Armstrong, Lawrence E; Maresh Carl M
Intravenous versus oral Rehydration: Physiological, Performance, and Legal Considerations

APPENDIX

Below are three tables which illustrate the possible four combinations of a Method and a Substance that may be either Permitted or Prohibited during the administration of an IV infusion.

TABLE 1

In principle, four possibilities exist when both the substance and the method may be either Permitted or Prohibited

Method and Substances 2 x 2 table

Method Prohibited Substance Prohibited	Method Permitted Substance Prohibited
Method Prohibited Substance Permitted	Method Permitted Substance Permitted

TABLE 2

Requirements for a TUE when the infusion is NOT given during a hospital admission, surgical procedure or clinical investigation.

Prohibited Method: IV infusion of >50 ml/6 h Prohibited Substance: Insulin <p style="text-align: center; color: red;">Need TUE for substance Need TUE for method</p>	Permitted Method: Infusion of ≤50 ml/6 h Prohibited Substance: Insulin <p style="text-align: center; color: red;">Need TUE for substance</p>
Prohibited Method: IV infusion of >50 ml/6 h Permitted substance: Glucose/saline <p style="text-align: center; color: red;">Need TUE for method</p>	Permitted Method: Infusion of ≤50 ml/6 h Permitted Substance: Liquid iron supplement <p style="text-align: center; color: green;">NO TUE</p>

TABLE 3

Requirements for a TUE when infusion is given during a hospital admission, surgical procedure or clinical investigation.

Prohibited Method: IV infusion of >50 ml/6 h Prohibited Substance: Insulin <p style="text-align: center;">Need TUE for substance</p>	Permitted Method: Infusion of ≤50 ml/6 h Prohibited substance: Insulin <p style="text-align: center;">Need TUE for substance</p>
Prohibited Method: IV infusion of >50 ml/6 h Permitted substance: Glucose/saline <p style="text-align: center;">NO TUE</p>	Permitted Method: Infusion of ≤50 ml/6 h Permitted Substance: Liquid iron supplement <p style="text-align: center;">NO TUE</p>