delivered to the subject, as only a small proportion of the dose flows to the alveoli where it can be subsequently absorbed.

[0010] In addition, it is recommended that adrenalin be administered immediately in the event of cardiac arrest, and furthermore that adrenalin be administered until a normal rhythm is restored in accordance with the abovementioned practice guidelines. In this regard, any time spent finding an appropriate vein and waiting for the blood to circulate to the heart under the influence of saline, or waiting for a liquid dose to flow into the alveoli, perfuse into the blood stream and travel to the heart, can adversely impact a subject's expected outcome.

[0011] Other methods of adrenalin administration include intraosseous infusion, administration via a central line, and the like. However, such methods typically require advanced medical training and specialist apparatus.

Summary

[0012] The present invention seeks to ameliorate one or more of the problems associated with the prior art.

[0013] In one aspect, the present invention refers to use of microparticles of adrenalin in the manufacture of a particulate medicament for the treatment of at least one of cardiac failure and anaphylaxis, wherein the particulate medicament is to be administered by a) generating a gas flow using positive pressure gas; b) entraining a dose of the particulate medicament in the gas flow; and, c) the gas flow including the entrained particulate medicament is to be delivered to a subject's airway. In another aspect, the present invention refers to use of microparticles of glucose in the manufacture of a particulate medicament for the treatment of hypoglycaemia, wherein the particulate medicament is to be administered by including: a) generating a gas flow using positive pressure gas; b) entraining a dose of the particulate medicament in the gas flow; and, c) the gas flow including the entrained particulate medicament is to be administered to a subject's airway. In yet another aspect, the present invention refers to use of microparticles of adrenalin in the manufacture of a particulate medicament for the treatment of at least one of cardiac failure and anaphylaxis, wherein the particulate medicament is to be delivered using an apparatus including: a) an inlet that in use is in fluid communication with a supply of positive pressure gas; b) an outlet that in use is in fluid communication with a subject's airway to deliver

the positive pressure gas thereto; and, c) a medicament supply that provides a dose of the particulate medicament so that the particulate medicament is entrained in a gas flow from the inlet to the outlet, thereby resulting in the particulate medicament to be delivered to the subject's airway. In a further aspect, the present invention refers to use of microparticles of glucose in the manufacture of a particulate medicament for the treatment of hypoglycaemia, wherein the particulate medicament is to be delivered using an apparatus including: a) an inlet that in use is in fluid communication with a supply of positive pressure gas; b) an outlet that in use is in fluid communication with a subject's airway to deliver the positive pressure gas thereto; and, c) a medicament supply that provides a dose of the particulate medicament so that the particulate medicament is entrained in a gas flow from the inlet to the outlet, thereby resulting in the particulate medicament to be delivered to the subject's airway. In yet a further example, the present invention refers to use of microparticles of adrenalin in the manufacture of a particulate medicament for the treatment of anaphylaxis, wherein the particulate medicament is to be administered by: a) generating a gas flow using negative pressure gas; b) entraining a dose of particulate medicament in the gas flow; and, c) the gas flow including the entrained particulate medicament to be delivered to the subject's airway. In one example, the present invention refers to use of microparticles of glucose in the manufacture of a particulate medicament for the treatment of hypoglycaemia, wherein the particulate medicament is to be administered by: a) generating a gas flow using negative pressure gas; b) entraining a dose of particulate medicament in the gas flow; and, c) the gas flow including the entrained particulate medicament to be delivered to a subject's airway. In another example, the present invention refers to use of microparticles of adrenalin in the manufacture of a particulate medicament for the treatment of anaphylaxis, wherein the particulate medicament is to be delivered using an apparatus including: a) an inlet; b) an outlet that in use is in fluid communication with a subject's airway to allow the subject to supply a negative pressure gas thereto; and, c) a medicament supply that provides a dose of the particulate medicament so that the particulate medicament is entrained in a gas flow from the inlet to the outlet, thereby resulting in the particulate medicament to be delivered to the subject's airway. In yet another example, the present invention refers to use of microparticles of glucose in the manufacture of a particulate medicament for the treatment of hypoglycaemia, wherein the particulate medicament is delivered using an apparatus including: a) an inlet; b) an outlet that in use is in fluid communication with a subject's airway to allow the subject to supply

a negative pressure gas thereto; and, c) a medicament supply that provides a dose of the particulate medicament so that the particulate medicament is entrained in a gas flow from the inlet to the outlet, thereby delivering the particulate medicament to the subject's airway. In one example, there is described an apparatus for use in administering a particulate medicament to a biological subject's airway, the apparatus including:

a) an inlet that in use is in fluid communication with a supply of positive pressure gas;
b) an outlet that in use is in fluid communication with the subject's airway to deliver the positive pressure gas thereto; and,
c) a medicament supply that provides a dose of particulate medicament so that the particulate medicament is entrained in a gas flow from the inlet to the outlet, thereby delivering the particulate medicament to the subject's airway.

[0014] Typically the apparatus includes a channel extending at least part way between the inlet and the outlet to allow gas flow therethrough.

[0015] Typically the apparatus includes housing defining the channel.

[0016] Typically the channel includes a medicament receiving surface that receives the particulate medicament prior to the particulate medicament being entrained in the gas flow.

f) a manual resuscitator; and,

g) an operator exhaling in fluid communication with at least one of the inlet, a reservoir outlet piece, and a mask.

[0041] Typically the gas flow delivers particulate medicament into the subject's lungs without requiring the subject to inhale.

[0042] In another example, there is disclosed a method of delivering particulate medicament to a biological subject, the method including:

a) generating a gas flow using positive pressure gas;

b) entraining a dose of particulate medicament in the gas flow;

c) delivering gas flow including the entrained particulate medicament to the subject's airway.

[0043] Typically the method includes delivering the particulate medicament into the subject's lungs without requiring the subject to inhale.

[0044] Typically the gas flow is delivered in an amount corresponding to an artificial breath.

[0045] In yet another example, there is disclosed a method of performing cardiopulmonary resuscitation (CPR) on a biological subject, the method including supplying at least one medicated breath to the subject's airway, wherein the medicated breath includes a positive pressure gas in an amount corresponding to an artificial breath, and an entrained dose of particulate medicament.

[0046] Typically the method includes supplying at least one non-medicated breath to the subject's airway.

[0047] Typically the method includes performing at least one chest compression on the subject.

[0048] Typically the method includes performing the chest compressions and supplying the medicated breaths in the ratio of any one of:

a) 30:2;

b) 30:1; and,

c) 60:1.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1) Use of microparticles of adrenalin in the manufacture of a particulate medicament for the treatment of at least one of cardiac failure and anaphylaxis, wherein the particulate medicament is to be administered by :
   a) generating a gas flow using positive pressure gas;
   b) entraining a dose of the particulate medicament in the gas flow; and,
   c) the gas flow including the entrained particulate medicament is to be delivered to a subject's airway.
2) Use of microparticles of glucose in the manufacture of a particulate medicament for the treatment of hypoglycaemia, wherein the particulate medicament is to be administered by

   a) generating a gas flow using positive pressure gas;
   b) entraining a dose of the particulate medicament in the gas flow; and,
   c) the gas flow including the entrained particulate medicament is to be administered to a subject's airway.
3) The use according to claim 1 or claim 2, wherein the positive pressure gas is supplied in accordance with artificial respiration to the subject, and wherein the gas flow is to be delivered in an amount corresponding to an artificial breath.
4) The use according to any one of the claims 1 to 3, wherein the gas flow in order for particulate medicament to be delivered into the subject's lungs is without requiring the subject to inhale.
5) The use of any one of claims 1 to 4, wherein the particulate medicament is to be administered during performing cardiopulmonary resuscitation (CPR) of the subject.
6) The use of claim 5, wherein the medicament to be administered during CPR includes at least one of:
   a) at least one non-medicated breath to be supplied to the subject's airway; and,
   b) at least one chest compression to be performed on the subject.
7) Use of microparticles of adrenalin in the manufacture of a particulate medicament for the treatment of at least one of cardiac failure and anaphylaxis, wherein the particulate medicament is to be delivered using an apparatus including:
   a) an inlet that in use is in fluid communication with a supply of positive pressure gas;

b) an outlet that in use is in fluid communication with a subject's airway to deliver the positive pressure gas thereto; and,

c) a medicament supply that provides a dose of the particulate medicament so that the particulate medicament is entrained in a gas flow from the inlet to the outlet, thereby resulting in the particulate medicament to be delivered to the subject's airway.

8) Use of microparticles of glucose in the manufacture of a particulate medicament for the treatment of hypoglycaemia, wherein the particulate medicament is to be delivered using an apparatus including:

a) an inlet that in use is in fluid communication with a supply of positive pressure gas;

b) an outlet that in use is in fluid communication with a subject's airway to deliver the positive pressure gas thereto; and,

c) a medicament supply that provides a dose of the particulate medicament so that the particulate medicament is entrained in a gas flow from the inlet to the outlet, thereby resulting in the particulate medicament to be delivered to the subject's airway.

9) The use according to claim 7 or claim 8, wherein the apparatus includes a channel extending at least part way between the inlet and the outlet to allow gas flow therethrough.

10) The use claim 9, wherein the apparatus includes a housing defining the channel.

11) The use according to claim 9 or claim 10, wherein the channel includes a medicament receiving surface that receives the particulate medicament prior to the particulate medicament being entrained in the gas flow, the medicament receiving surface being defined by at least one of:

a) a shape of the channel;

b) a curvature of the channel; and,

c) surface properties of at least part of a channel surface.

12) The use according to any one of the claims 9 to 11, wherein the channel includes at least one baffle for generating turbulent gas flow within the channel.

13) The use according to any one of the claims 7 to 12, wherein the apparatus includes an actuator for selectively supplying a dose of the particulate medicament into the gas flow, wherein the actuator at least one of:

a) includes a button for actuation by an operator; and,

b) delivers the dose of particulate medicament into a channel extending at least part way between the inlet and the outlet, wherein the actuator any one of:

i) includes a piston for urging the particulate medicament into the channel; and,

ii) selectively delivers particulate medicament from a medicament container of the apparatus, wherein the actuator includes a dosing system that receives a dose of particulate medicament from the medicament container and transfers the dose of particulate medicament to the channel.

14) The use according to any one of the claims 7 to 13, wherein the apparatus includes a one-way valve proximate the inlet to prevent flow of gas from the apparatus out through the inlet.

15) The use according to any one of the claims 7 to 14, wherein the medicament supply includes at least one medicament container containing one or more doses of the particulate medicament, the medicament container being in fluid communication with at least one of the inlet and the outlet so that as gas flows from the inlet to the outlet, the particulate medicament is entrained in the gas flow and is to be delivered to the subject's airway.

16) The use according to claim 15, wherein the medicament container includes at least one rupturable membrane that, when ruptured, allows the gas to flow through the medicament container to thereby entrain the particulate medicament.

17) The use according to claim 17 or claim 18, wherein the apparatus includes a plurality of medicament containers, each medicament container containing a dose of the particulate medicament, and each container being selectively connectable to at least one of the inlet and outlet.

18) The use according to claim 17, wherein the inlet and the outlet are mounted to a housing, and wherein the apparatus includes a rotary cartridge rotatably mounted to the housing wherein the rotary cartridge includes the plurality of medicament containers, the medicament containers being selectively positionable in a delivery position in which the medicament container is in fluid communication with at least one of the inlet and outlet, and wherein in use, gas under negative pressure rotates the rotary cartridge to provide a next medicament container in the delivery position.

19) The use according to any one of the claims 7 to 18, wherein the apparatus includes at least one inlet adapter for coupling the apparatus to at least one of:

a) a bag-valve-mask (BVM);

b) an Ambu bag;

c) a ventilator;

d) an oxygen pump;

e) a compressed gas supply;

f) a manual resuscitator; and,

g) a reservoir outlet piece; and,

wherein the apparatus includes at least one outlet adapter for coupling the apparatus to at least one of:

a) a mask; and,

b) an endotracheal tube; and,

wherein at least one of the inlet adaptor and the outlet adaptor includes a universal adaptor.

20) Use of microparticles of adrenalin in the manufacture of a particulate medicament for the treatment of anaphylaxis, wherein the particulate medicament is to be administered by :

a) generating a gas flow using negative pressure gas;

b) entraining a dose of particulate medicament in the gas flow; and,

c) the gas flow including the entrained particulate medicament to be delivered to a subject's airway.

21) Use of microparticles of glucose in the manufacture of a particulate medicament for the treatment of hypoglycaemia, wherein the particulate medicament is to be administered by :

a) generating a gas flow using negative pressure gas;

b) entraining a dose of particulate medicament in the gas flow; and,

c) the gas flow including the entrained particulate medicament to be delivered to a subject's airway.

22) Use of microparticles of adrenalin in the manufacture of a particulate medicament for the treatment of anaphylaxis, wherein the particulate medicament is to be delivered using an apparatus including:

a) an inlet;

b) an outlet that in use is in fluid communication with a subject's airway to allow the subject to supply a negative pressure gas thereto; and,

c) a medicament supply that provides a dose of the particulate medicament so that the particulate medicament is entrained in a gas flow from the inlet to the outlet, thereby resulting in the particulate medicament to be delivered to the subject's airway.

23) Use of microparticles of glucose in the manufacture of a particulate medicament for the treatment of hypoglycaemia, wherein the particulate medicament is to be delivered using an apparatus including:

a) an inlet;

b) an outlet that in use is in fluid communication with a subject's airway to allow the subject to supply a negative pressure gas thereto; and,

c) a medicament supply that provides a dose of the particulate medicament so that the particulate medicament is entrained in a gas flow from the inlet to the outlet, thereby delivering the particulate medicament to the subject's airway.