

CONNECTOR

This invention relates to a connector. More specifically, this invention relates to a medical connector.

As is known, needles are routinely used in hospitals for the transfer of medicaments to patients under aseptic conditions. For example, in some cases, it has been quite common for needles to be attached to a luer connector of an IV bag and to be inserted into Y sites. The advantages provided by this include the transfer of a medicament under aseptic conditions and, upon removal of the needle, a self sealing system to maintain a IV line sterile.

A second system which is also quite common is for a catheter to be inserted into a patient with an intermittent injection port connected to the catheter. In this system, the intermittent port contains a rubber septum through which a needle may pass for the infusion of medicaments. As in the above case, the transfer of medicaments can be accomplished aseptically.

However, in these and other types of fluid transfers, the exposed needle can readily cut a user and, possibly lead to blood contamination with potentially life threatening results.

In the past, various types of structures have been proposed to avoid needle sticks from needles, for example, as described in U.S. Pat. No. 4,752,292. In this case, it has been proposed to mount the needle within a cap member so that the needle does not project beyond the cap member. In this case, the cap member is, in turn, formed so as to be mounted on a connector having a seal which can be pierced by the needle. However, such medical connectors are rather cumbersome in construction and in use.

Accordingly, it is an object of the invention to minimize the possibility of a needle puncture in the application of medicaments to a patient.

It is another object of the invention to provide a connector of relatively simple construction which can be used in the aseptic transfer of medicaments to a bedridden patient.

It is another object of the invention to provide a connector which is simple to use for the periodic delivery of a medicament to a patient.

It is another object of the invention to provide a connector which can be constructed at a minimum of cost.

Briefly, the connector is constructed with a housing in which a hollow needle is mounted in a self-contained recessed manner. In addition, a rubber septum is disposed in the housing in facing relation to a distal end of the needle while an adaptor is provided which extends coaxially of the needle on a side of the septum opposite the needle in order to define an internal chamber. The needle and the septum are initially disposed in opposed spaced relation relative to each other while the adaptor is movable into the connector in order to permit the needle to pierce through the septum into communication with the chamber of the adaptor.

In one embodiment, the connector is constructed for mounting between two tubes of an IV line. In this case, the housing has a hollow cylindrical portion defining a flow path for fluid and is adapted to receive tubing at opposite ends. In addition, a female adaptor is provided with extends radially of and in communication with the flow path in the cylindrical portion while the rubber septum is disposed in the adaptor to separate the internal chamber of the adaptor from the flow path in the

cylindrical portion of the housing. A collapsible means in the form of a cylindrically shaped structure is mounted on the housing with an end wall secured to the needle and a cylindrical collapsible wall spaced concentrically about the needle and secured to the housing. Upon collapsing of the wall from an extended position with the needle spaced from the septum to a collapsed position, the needle pierces the septum and extends into the chamber of the adaptor for conveying fluid therefrom. In addition, the needle is provided with at least one aperture at an intermediate point which opens into the flow path of the cylindrical portion of the housing so that the fluid conveyed from the adaptor chamber is directed into the flow path of a fluid passing through the tubing connected to the housing.

When in use, a male adaptor of a fluid supply is inserted into the female adaptor. In this way, fluid, such as a medicine, contained in the fluid supply can be delivered to the chamber of the female adaptor under a slight pressure. Next, the collapsible cylinder to which the hollow needle is connected is collapsed to cause the hollow needle to pierce the septum. The fluid in the female adaptor chamber is then able to flow through the hollow needle and into the main flow path via the aperture in the side wall of the needle.

When delivery of the fluid is to cease, the collapsed cylinder is expanded, thus, withdrawing the needle from within the septum. In this respect, the septum is self-sealing so that upon withdrawal of the needle, the septum seals on itself so that the chamber within the adaptor and the main flow path are sealed from each other. Thereafter, the male adaptor of the fluid supply can be removed. At this time, a cap can be placed over the female adaptor to maintain a sterile condition.

In another embodiment, the connector has a housing with a male luer connection at one end which defines a flow path for fluid. In this case, the hollow needle is mounted in the housing coaxially of the male luer connection and is provided with a proximal end opening into the flow path of the connection. In addition, a female adaptor is slidably mounted in the housing coaxially of the needle to define an internal chamber while a rubber septum is disposed in sealed relation between the female adaptor and the needle. In this case, a collapsible sleeve means is disposed about the needle between the housing and the adaptor in order to seal the space about the needle and to permit the needle to pierce through the septum into communication with the adaptor during movement of the adaptor into the housing. In this way, fluid can be conveyed from the adaptor chamber through the hollow needle into the flow path of the male luer connection. In this embodiment, the collapsible means may be formed by a collapsible cylindrical wall while being integral with the septum.

This latter embodiment can be used with a Y-site. In this respect, the male luer connection can be inserted into a branch of a Y-site. In this condition, a male adaptor of a fluid supply means can be inserted into the female adaptor in a sealed relationship. Thereafter, the male adaptor is pushed into the female adaptor such that the female adaptor moves into the housing of the connector to cause the hollow needle to pierce the septum thereby communicating the fluid within the female adaptor with the interior of the Y-site branch. Withdrawal of the female adaptor to a retracted position within the housing causes the needle to withdraw from the septum, thereby stopping further flow of fluid into the branch of the Y-site.