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The invention relates to a catheter according to the preamble of Claim 1.

Systems are of advantage for therapeutic purposes, by means of which the pharmaceutical preparation may be administered directly to the affected part of the patient's body. In order to carry out this kind of treatment within hollow organs, body cavities or blood streams, in particular arteries, various catheters have been suggested which enable the drug to be brought close to the affected tissue area. The simplest catheters of this kind are infusion catheters which have one hole or several thereof in the vicinity of the catheter tip or are even perforated. These are enlarged so that they come into close contact with the wall of the vessel and supply the pharmaceutical preparation directly to the tissue. An angioplastic balloon (porous balloon) may therefore be provided which is inflated under pressure when the pharmaceutical preparation is supplied, which rests against the artery wall and may then be used to introduce the pharmaceutical preparation under pressure into the tissue.

The disadvantage with such concepts, however, is that the preparation only has a short term effect and the amount of preparation supplied is uncertain. If simple infusion catheters are used, the pharmaceutical preparation may also be flushed away very quickly. This could result in an infusion being necessary over a period of several days in order to achieve a specified concentration of pharmaceutical preparation at the part to be treated. This would mean a long stay in hospital and a great risk should there be infections and other complications. It is also felt to be a disadvantage that the administration of the pharmaceutical preparation cannot be carried out at the same time as a

dilatation, in one treatment step.

A catheter, according to the preamble of Claim 1, is known from US-A-4-578 061. Here, the injection needle in the catheter tip is displaced by means of a flexible wire which passes through the same lumen through which the preparation is supplied. The injection needle is only hollow in its front part and has, at the rearward end, a laterally guided connecting channel which, when the needle is in a projected position, must align with a further connecting channel provided in the catheter tip so that the preparation may be administered. Such an alignment is not easily ensured.

WO92/10142 discloses a prostatic catheter. Here, several tubular needles may be pushed out of the catheter head in order to position the fibreglass element and thermo-probes in the tissue.

The invention has the object of providing a catheter which enables a simple and safe administration of the pharmaceutical preparation to parts inside the body, preferably body cavities, hollow organs or vessels, which require the preparation, while avoiding the above disadvantages.

The object is achieved by catheters according to the Claims 1, 6, 8 and 12. Further constructions of the invention are characterised by the dependent subclaims.

According to the invention, a catheter has needles or cannulae. When in a retracted position, these needles are retained inside the outer shaft. In this position, the catheter can be introduced into a hollow organ or into the bloodstream, more particularly an artery. Furthermore, a catheter is provided with a device by means of which the needles may be pushed out of the catheter. This movement is initiated and carried out

when the catheter is in the desired position. In so doing, the needles rest against or enter the arterial or vessel wall. The needles are hollow and have a channel through which the pharmaceutical preparation may be introduced into the tissue. The needles entering the vessel wall cause a perforation which is so small, because of the thinness of the needle, that no bleeding occurs. This perforation also makes it possible to deposit a specified amount of pharmaceutical preparation in the tissue.

For the displacement of the needles, an inner tube may be provided in the catheter which is longitudinally displaceable relative to the outer shaft and to which the needles are secured such that they are pushed by the inner tube to the vessel wall or into the tissue. The securement of the needles to a balloon-like sheath which expands under pressure is another possibility. In this construction, the needles are displaced by the pressure in the sheath acting upon them. Finally, the needles may also be provided with extensions all of which may be displaced in the catheter.

The pharmaceutical preparation or the fluid is supplied from the catheter end which is positioned extracorporeally. If the preparation is not intended to enter too deeply into the vessel wall, it is advantageous to design the needle points such that the ground end faces adhering to the vessel wall, for example an artery, penetrate only slightly or are positioned so as to be parallel to the wall if possible. This is achieved by the end faces on the projected needle points extending as near parallel as possible, relative to the catheter axis. In order to ensure a preferred method of administration, it is intended that the needles slightly penetrate the tissue. Therefore, the normal line of the end face should not be entirely in parallel to the needle axis but deviate at least by a

small angle so that the needles not only rest flat against the tissue, but their point may be slightly pressed into the tissue. The force applied during manipulation and the angle then determine the depth of penetration of the needle points into the tissue, so that a targeted injection in terms of depth, for example, of a vessel wall may be limited locally. The needle point used for the desired method of administration may obviously be correspondingly machined. It may, for example, be blunt, round or facetted.

According to a further development of the invention, needles are used which are pretensioned mechanically or have a natural curvature in the front region so that the needles emerge in the direction of the wall when displaced outwardly by means of an operating device. If the needles are of a more flexible construction, so that there is not enough pretension for the needles to be guided completely in the direction of the wall, needle guides may also be provided on the catheter tip by means of which the needles are bent or pushed to the wall in a targeted manner.

In one embodiment, the displacement mechanism is a multi-lumina tube, movable in the longitudinal direction of the catheter. This tube has several channels which extend from the catheter tip to the other end of the catheter. In these channels, bent needles are secured to the catheter tip while being pretensioned. When the multi-lumina tube is moved in the catheter outer shaft, the needles are displaced in the longitudinal direction and because they are pretensioned, moved along the vessel wall. For the operation, a device is mounted at the end opposite the catheter tip which mainly comprises two parts. Here, the catheter outer shaft is secured to the first part and the multi-lumina tube to the second part. These two parts are kept apart by means of a

spring so that the needles, when in the rest position, are inside the catheter outer shaft. When the two parts are pressed together, the multi-lumina tube is pushed forward in the outer shaft and the needles move out of the catheter tip.

A similar operating device may also be used when the needles are intended to be pressed outwards by a pressurised, balloon-like sheath. The pressing together of the two parts of the operating device then produces the corresponding pressure.

It is also intended that the entire length of the needles and the tubular extensions thereof extend through the catheter up to the operating device and may be longitudinally displaceable with said device in the catheter so that the needles may be pushed out of the catheter tip. The pharmaceutical preparation to be administered is then supplied under pressure to the operating device and the needle extensions.

In a further embodiment, according to the invention, a conventional balloon is arranged in front of the injection part of the catheter. Here, the guide wire is, preferably, arranged outside the catheter and is only guided through an inner lumen (monorail) within the region of the balloon as disclosed in US-A-5,154,725. Naturally, it is also possible to construct the guide wire through the entire catheter shaft, the injection head and the balloon so as to be displaceable.

This is an advantageous method of combining the drug therapy of the tissue and dilatation in one treatment step. This means that no catheter change is necessary, thereby considerably shortening the time of intervention and stress to the patient. Furthermore, the combined injection/balloon catheter makes it possible for the surgeon to decide on the type of treatment after the

catheter has already been introduced. It is also regarded as advantageous that the mounting of the balloon in front of the injection head results in a very soft widening of the passage. After the injection, the dilatation by means of the balloon may be repeated, if necessary, in order to optimise the distribution of the pharmaceutical preparation and to overcome any possible mechanical alterations by the catheter. Finally, a treatment using only one injection/balloon catheter is cheaper than a treatment using two separate catheters for the same purpose.

Further advantages and features of the invention are apparent from the following description of embodiments in combination with the claims and the drawing. Shown are:

Fig. 1 a schematic representation of a catheter, according to the invention, with needles in a retracted position;

Fig. 2 the catheter, according to the invention, as shown in Figure 1, with outwardly displaced needles;

Fig. 3 an operating device for displacing a multi-lumina tube in the catheter;

Fig. 4 a radial section through another embodiment of the invention;

Fig. 5 a further embodiment of the catheter, according to the invention;

Fig. 6 an operating device for displacing the needles in the catheter as shown in Figure 5;

Fig. 7 a section through line VII-VII of Figure 5,

enlarged to scale.

Fig. 8 a section through the head part of a combined injection/balloon catheter, according to the invention, along line VIII-VIII of Figure 11;

Fig. 9 an operating device for longitudinally displacing the injection needles in the catheter with connections for the medication and the inflation/deflation of the balloon;

Fig. 10 a section along line X-X of Figure 8;

Fig. 11 a section along line XI-XI of Figure 8.

Figure 1 shows a catheter 10, which may be introduced into the body on a guide wire 5, in a manner known per se. The catheter 10 has an outer shaft 12 to whose end a catheter tip 14 is secured. The catheter tip 14 may be integrally connected to the outer shaft 12, by means of welding or gluing. The catheter tip 14 has a longitudinally extending channel 16 through which the guide wire 5 passes. Inside the outer shaft 12, there is also an inner tube 20 which may be displaced in the longitudinal direction. This tube has a central channel 22 through which the guide wire 5 passes. Furthermore, there are channels 24 (lumina) in the inner tube, and hollow needles 26 are secured to their end near the catheter tip. The catheter tip 14 is provided with suitably shaped grooves or recesses (cf. Figure 11) which extend in the longitudinal direction and terminate in openings 28. These openings either emerge from the side or from a rounded or conical catheter tip.

The hollow needles 26 are pretensioned mechanically and pressed radially against the outer shaft 12. In so doing, they are non-pivotally held on the side by the walls of the groove openings 28. When the inner tube 20

is pushed forward in the outer shaft 12, the needles are moved forwards and because of the pretension or because of being bent when pushed along the inner wall of the opening 28, the needles may move outwardly where they rest against the vessel wall or enter or perforate said wall in order to reach the adventitia; a choice which will depend on the experience of the surgeon. A pharmaceutical preparation may then be supplied to the tissue through the channels 24 and the channels in the hollow needles 26, not shown. This preparation then issues on the end face 30 of the needles 26. The end face 30 of the projected needles is, preferably, arranged such that in the longitudinal direction it is parallel to the catheter axis. This means that the face 30 rests more or less flat against the vessel wall and can only be inserted deeper into the tissue by using more force. If a greater penetration of the tissue is intended, it is recommended that the normal line of the faces 30 be arranged other than in a vertical line, relative to the catheter axis, for the needles to penetrate the tissue. Other ground needle surfaces adapted to the application may obviously also be used in order to penetrate the tissue more deeply. In the embodiment shown in Figures 1 and 2, several needles 26 are provided which issue at several points of the catheter 10 because of the displacement of the inner tube 20, so that the catheter is supported on the vessel wall on all sides and is held centrally. Thus, the faces 30 rest against the wall in a specified manner, or the needles enter the tissue if their surfaces are correspondingly ground. An unintentional flushing away of the pharmaceutical preparation or insufficient contact of an end face 30 with the vessel wall is thus prevented.

At least three needles are necessary to achieve satisfactory support. Any number of needles is possible, and they may be distributed over the cross-

section in both a regular and irregular manner. The use of more needles also improves the flow of the pharmaceutical preparation. If the arteries or vessels are thin, there may not be sufficient room for a larger catheter and a single needle will then have to suffice.

If for greater stability or an improved flow of the preparation several needles 26 are required, the inner tube 20 is, preferably, a multi-lumina tube.

Figure 3 illustrates the method of operation of the device 30 in order to achieve the displacement of the needles in a catheter as shown in Figures 1 and 2. This operating device largely comprises two parts 34 and 35. Part 34 remains in a fixed position, relative to the catheter, and will be called hereinafter a fixed part 34. Opposite this part, there is a movable part 35. The outer shaft 12 is secured to the fixed part 34, and the inner tube 20 is positioned in the movable part 35. A guide 36 provided on the fixed part 34 and a guide 38 provided on the movable part engage with one another so that the inner tube 20 can only move axially, relative to the outer shaft. A spring 40 keeps the parts 34 and 35 apart. The spacing of the end face of the guide 38 from the opposite stop is such that the needles 26 are secured in the retracted position, as shown in Figure 1. If the movable part 35 and the fixed part 34 are pressed together, the inner tube moves axially in the direction of the catheter tip, so that a position is reached, as shown in Figure 2, in which the needles are guided along the vessel wall as a result of being pretensioned.

Figure 3 illustrates that the inner tube 20 is secured in the part 35, whilst the inner lumen 42 is guided further and allows the guide wire 5 to exit from the inner lumen to the rear through an opening 44. The pharmaceutical preparation is supplied via a lateral connection 45 and then flows through a distribution area

46 and via channels 24 until it reaches the needles 26.

Figure 4 shows a cross-section through another embodiment of the catheter. This catheter 50 has an outer shaft 12. In the centre of the catheter, there is a guide wire 5, as shown. The outer shaft has holes 52 through which needles 54 may be moved from the inside of the catheter outwardly. The needles 54 are secured to an inner tube 56. Between the inner tube 56 and the guide wire 5 there is also a further tube 58. The inner tube 56 is of such resilience that it becomes inflated like a balloon and rests against the outer sheath 12 when there is a build up of pressure between tubes 56 and 58. The needles 54 are then pushed out of the holes 52 and are able to rest against or penetrate the vessel wall. This embodiment shows a needle shape in which the end face 60 is different from that of the needles shown in Figures 1 and 2. In the needle faces 60 of this embodiment, the normal line of the faces is not vertical, relative to the catheter axis. This enables the needle points to enter the vessel wall or penetrate the tissue more deeply. The advantages have already been described. However, it is also possible to provide the needles 56 with end faces 60 which rest flat against the vessel wall in the same way as the end faces 30 illustrated in the first embodiment.

In the embodiment shown in Figure 4, the needles are supplied with pharmaceutical preparation via separate channels connected to the bore 55 in the needle 54. Furthermore, pressure is applied to the cavity between the tubes 56 and 58. Thus, by being able to use, at the same time, a high inflation pressure and a low pressure for administering the pharmaceutical preparation, a significant disadvantage of prior art inflatable balloon catheters is avoided. Furthermore, as a result of the selectable displacement of the needles individually by varying the penetration depths, the pharmaceutical

preparation may be administered at different sites, i.e. into the inner layers of the vessel, into the vessel wall or it may also be stored near the vessel. The advantage is, moreover, that dilatation and injection of the preparation may be controlled individually as two clearly separate processes. For this, an operating device of known kind may be used which supplies the pressure medium and the pharmaceutical preparation separately.

In such a device for operating the catheter 50, the inflation pressure for widening the inner tube 56 is supplied via a connection with a cavity between the tubes 56 and 58, thereby producing the dilatation. Via a separate connection provided on the operating device, the pharmaceutical preparation is supplied to the channels which extend in the cavity between the needles and to which the needles 54 are connected. Both embodiments of the invention have the advantage that the use of the needles 26 or 54 enables a targeted injection into a vessel wall and/or close thereto. The penetration depth of the needle and thus of the pharmaceutical preparation may also be determined by the end faces 30 and 60 being designed accordingly.

Figure 5 shows a further embodiment of the catheter 110. Here, the resiliently outwardly pretensioned needles 26 have tubular extensions 126. These extensions may be integrally formed with the needles and extend through the channels of a catheter which is in the form of a multi-lumina tube, the diameter of the channels being large enough for the extensions 126 of the needles 26 to slide therein easily.

At the front end of the multi-lumina tube, there is an outer shaft 112 in which the needles may be guided and retracted. As already explained, the catheter tip 14 cooperating with the outer shaft 112 is such that the

resiliently pretensioned needles 26 are guided, as required, when being ejected. Here, as shown in Figures 5 and 7, the outer shaft 112 is provided with a thickened part 113. This benefits each needle when in the front inner region. The thickened part, in addition to the groove-like recesses in the catheter tip, guides the needle and prevents it from swivelling round during its exit. The guide wire 5 passes through the catheter tip. Preferably, the catheter tip and the outer shaft are made of metal or a hard, easily slidable plastic material.

The operating device 132, as shown in Figure 6, serves to displace the needles 26 and the extensions 126 thereof. This operating device is largely the same as the device 30 shown in Figure 3. The rear end of the multi-lumina tube 120 is secured to the fixed part 134, while the needle extensions 126 extend to the movable part 135 and are secured there so that the fluid of the pharmaceutical preparation may be supplied under pressure from the distribution volume 139, via the free lumina. This operating device is handled in the same way as that shown in Figure 3, but this device has a grip so that it may be operated with one hand only.

The use of both an even and uneven number of needles is possible, and they may also be distributed over a catheter cross-section in a regular or irregular manner.

When two needles, for example, are used it is also possible to pass the guide wire through eccentrically via e.g. a third channel of the multi-lumina tube. The guide wire may then also exit eccentrically from the catheter point.

A catheter of the above kind has, preferably, a diameter of between 0.5 mm and 5 mm, and the catheter point has a length of from 1 mm to 10 mm.

Figure 8 shows a further embodiment of the invention. Here, a balloon 211 is arranged in front of the injection part 210. As is common with the known monorail catheters, the guide wire 215 only passes through the inside of the balloon. The catheter tip 214 of the injection part is largely of the same construction as shown in Figure 5, whilst the catheter tip 214 is connected with the multi-lumina tube 220, via an outer shaft 212. From the catheter tip 214, the hollow needles 26 extend through the multi-lumina tube 220 to the operating device as shown in Figure 9. These hollow needles 26, not shown, are connected to the thrust mechanism which will be explained hereinafter. The inflation medium is supplied through the inner lumen 216 of the multi-lumina tube 220. The inner lumen is continued as a bore through the catheter tip 214 and ends in the lumen for inflating the balloon 211.

Figures 10 and 11 show two cross-sections through the catheter tip. Figure 10 shows a multi-lumina tube 220 which is surrounded by an outer shaft 212 and in which the channels for the hollow needles and the extensions 226 thereof are in a triangular arrangement, relative to one another, as illustrated here. Reinforcing wires 230 are injection-moulded into the material of the multi-lumina tube between the channels for the hollow needle extensions. These reinforcing wires ensure that the catheter does not unintentionally bulge to the side when the hollow needle is pushed along its inside.

Figure 9 shows the operating device and the thrust mechanism 232 by means of which the hollow needles or the extensions 226 thereof are displaceable along the multi-lumina tube 220 for the injection to be carried out. For this purpose, the thrust mechanism comprises a fixed part 234 and a movable part 235 which is held in position by means of a spring 240, in which the hollow needles are retracted inside the catheter tip 214. The

length, i.e. the path over which the hollow needles may be pushed out of the catheter tip is determined by a stop pin 230 which is mounted in the fixed part and engages in a groove 231 in the movable part 235. The length of this groove 231 determines the needle path.

The multi-lumina tube 220 is glued to the front end of the fixed part 234 and is fixedly held there. The same applies to the multi-lumina tube section 236 in the movable part 235, to which the ends of the extensions 226, leading to a distribution area 238, are also secured by glueing. Thus, when the thrust mechanism is operated in the direction of the arrows indicated, the hollow needles may be moved out of the catheter tip.

The inner lumen 216 is guided laterally out of the fixed part 234 and ends in a connection 245 through which the inflation medium is supplied in a manner known per se. The deflation is also effected through the same connection.

A corresponding connection 246 is provided on the movable part 235 and ends in the distribution area 238. The drug is administered through this connection 246 in a conventional manner.

To make the parts shown in the individual figures clearer and more visible, they are illustrated to a different scale.



Claims

1. A catheter (10) for injecting a fluid or a pharmaceutical preparation into hollow organs or body cavities, more particularly coronary vessels and arteries, comprising a catheter tip (14) insertable into arteries and a catheter-outer shaft (12), an injection needle (26) arranged so as to be displaceable in the catheter tip (14), the needle point, when in a retracted position, resting inside the catheter tip and, when in an extended position, protruding beyond the catheter tip for administering the fluid or the pharmaceutical preparation, further comprising an actuating device arranged at the extracorporeal end, having a first and a second part, the catheter-outer shaft being secured to one part of the actuating device and the two parts being kept apart by counteracting force, by means of which actuating device the needle point is displaceable through the catheter-outer shaft (12) and comprising an aperture (28) provided in the catheter tip (14), said aperture having a needle guide which permits the injection needle (26) to protrude to the side as well as in the forward direction, characterised in that several injection needles are provided which are secured to a tube (20) displaceable in the catheter (10), along the longitudinal axis thereof, which tube is constructed as a multi-lumina tube (20) displaceable in the catheter-outer shaft (12), in that the multi-lumina tube (20) is secured to the second part (35) of the actuating device (32), in that, when the two parts are pressed together in the direction of the counteracting force, the injection needles (26) fixed in the multi-lumina tube (20) are moved from the retracted into the outwardly protruding position, the fluid or the pharmaceutical preparation being capable of being supplied via the other part (35) and the multi-lumina tube (20) simultaneously, and in that a guide wire (5) is guided both inside the multi-lumina tube and through the

catheter tip (14).

2. A catheter according to claim 1, characterised in that three injection needles are used which are arranged at an angular distance of 120°.

3. A catheter according to claim 1 or 2, characterised in that the needle points have an end face (30) which, when in the extended position, extends substantially parallel with respect to the catheter axis.

4. A catheter according to one of claims 1 to 3, characterised in that the needle points have an end face whose normal line, when the points are in the extended position, extends at an angle to the radial direction of the catheter.

5. A catheter according to one or more of claims 1 to 4, characterised in that the needles (26) which are displaceable in the longitudinal direction are pre-tensioned or have a natural curvature, and in that the needle points, when the injection needles (26) are displaced, move in the longitudinal direction through the catheter-outer shaft (12) into a position so as to be protruding to the side.

6. A catheter (10) for injecting a fluid or a pharmaceutical preparation into hollow organs or body cavities, more particularly coronary vessels and arteries, comprising a catheter tip (14) insertable into arteries and a catheter-outer shaft (12), an injection needle (26) arranged so as to be displaceable in the catheter tip (14), the needle point, when in a retracted position, resting inside the catheter tip and, when in an extended position, protruding beyond the catheter tip for administering the fluid or the pharmaceutical preparation, comprising an actuating device arranged at the extracorporeal end, having a first and a second

part, the catheter-outer shaft being secured to one part of the actuating device and the two parts being kept apart by counteracting force, by means of which actuating device the needle point is displaceable through the catheter-outer shaft (12), and comprising an aperture (28) provided in the catheter tip (14), said aperture having a needle guide which permits the injection needle (26) to protrude to the side as well as in the forward direction, characterised in that the catheter-outer shaft is in the form of a multi-lumina tube (120) and is secured to one part (134) of the actuating device (132), that several injection needles (26) are provided and have tubular extensions (126) which each extend through a lumen of the multi-lumina tube (120) and are secured to the other part (135) of the actuating device (132), that the extensions (126) guided in the multi-lumina tube (120) move the injection needles (26) from the retracted in the outwardly protruding position when the two parts are pressed together in the direction of the counteracting force, the fluid or the pharmaceutical preparation being capable of being supplied to the injection needles (26) via the other part (135) and the extensions (126) simultaneously, and that a guide wire (5) is guided both inside the multi-lumina tube and through the catheter tip.

7. A catheter according to claim 6, characterised in that the displaceable extensions (126) of the injection needles (26) extend right up to the catheter tip.

8. A catheter (10) for injecting a fluid or a pharmaceutical preparation into hollow organs or body cavities, more particularly coronary vessels and arteries, comprising a catheter tip (14) insertable into arteries and a catheter-outer shaft (12), an injection needle (26) arranged so as to be displaceable in the catheter tip (14), the needle points, when in a

retracted position, resting inside the catheter tip and, when in an extended position, protruding beyond the catheter tip for administering of the fluid or the pharmaceutical preparation, comprising an actuating device arranged at the extracorporeal end, having a first and a second part, the catheter-outer shaft being secured to one part of the actuating device and the two parts being kept apart by counteracting force, by means of which actuating device the needle point being displaceable through the catheter-outer shaft (12), and comprising an aperture (28) provided in the catheter tip (14), said aperture having a needle guide which permits the injection needle (26) to protrude to the side as well as in the forward direction, characterised in that the catheter-outer shaft is in the form of a multi-lumina tube (220) and is secured to one part (234) of the actuating device (232), that several injection needles (260) are provided and have tubular extensions (226) which are secured to the other part (235) of the actuating device (232) so that each extends through a lumen of the multi-lumina tube (220), that the extensions (226) guided in the multi-lumina tube (220) move the injection needles (260) from the retracted into the outwardly projecting position, when the two parts are pressed together in the direction of the counteracting force, the fluid or the pharmaceutical preparation being capable of being supplied to the injection needles (260) via the other part (235) and the extensions (226) simultaneously, that a balloon (211) is placed on to the catheter tip (214) used for the injection, which may be inflated and deflated via a channel (216) of the multi-lumina tube (220), and that a guide wire (215) is guided through an internal lumen (217) in the balloon (211) up to the top of the balloon.

9. A catheter according to claim 8, characterised in that the guide wire (215) is guided up to the top either inside the multi-lumina tube (220) and then through the

catheter tip (214) and the balloon (211), or is guided outside the multi-lumina tube (220) up to the balloon (211) and only then passes through the internal lumen (217) in the balloon.

10. A catheter according to claim 8, characterised in that reinforcing wires (230) are moulded into the material of the multi-lumina tube.

11. A catheter according to one or several of claims 1 to 10, characterised in that apertures (28) with needle guides are arranged in the catheter tip (14; 214) which guide the injection needles, when these protrude, both to the side and in the forward direction.

12. A catheter (10) for injecting a fluid or a pharmaceutical preparation into hollow organs or body cavities, more particularly coronary vessels and arteries, comprising a catheter tip (14) insertable into arteries and a catheter-outer shaft (12), an injection needle (54) arranged so as to be displaceable in the catheter tip (14), the needle point, when in a retracted position, resting inside the catheter tip and, when in an extended position, protruding beyond the catheter tip for administering the fluid or the pharmaceutical preparation, comprising an actuating device arranged at the extracorporeal end, having a first and a second part, the catheter-outer shaft being secured to one part of the actuating device and the two parts being kept apart by counteracting force, by means of which actuating device the needle point is displaceable through the catheter tip, and comprising an aperture (52) provided in the catheter tip, said aperture having a needle guide which permits the injection needle (54) to issue to the side as well as in the forward direction, characterised in that a plurality of injection needles (54) are provided and are arranged on an inner tube (56) which is positioned outside an

internal tube (58), the space between the tubes being acted upon by pressure in order to widen the inner tube (56) and to push the needles through the catheter tip, and that a guide wire (5) is guided inside the inner tube (56) and through the catheter tip.