Fine Needle Aspiration Cytology Device ("Binder-valve")

User Manual

1 Introduction

This three-way piston valve is designed for use in Fine Needle Aspiration Cytology (FNAC). It is manufactured from nickel silver and from stainless special steel and has *Luer* needle and syringe outlets. Each piston fits its individually trimmed cylinder with a tolerance of 3 micrometers, This valve should not be disassembled, the pistons are not interchangeable. There is no need to disassemble the valve for cleaning, lubrication or sterilization purposes. Please do not try to repair the valve on your own. Please send in your valve for repair if cleaning and lubricating - following the procedure described below - fail to restore the original function.

2 Preparing your biopsy set

Put all you need on the table first, completely arranged as needed later; after aspiration there will be lack of time!

Syringe, valve, blocking stick, needles, microscopy slides arranged side by side and cleaned from dust, swabs, disinfection agent, pencil for slide identification ...

3 Generating underpressure before aspiration

Put your syringe (filled by air) on the female outlet of the valve, press down the piston and void the syringe through the valve (thus excluding a clotted working borehole and cleaning it from humidity). Then release the valve piston thus closing the valve, pull out the syringe piston and block it by the adjustable blocking stick. A standard underpressure is achieved by a 20 ml syringe blocked at 20 ml.

4 Puncture

Only after blowing through the valve and generation of the underpressure, fit your puncture needle on the male outlet of the valve, take the complete aspiration device (needle, valve, blocked syringe) like a pencil, thumb and middle finger hold the valve, the tip of the index finger lies on top of the piston, the syringe lies between the thumb and the index finger, and avoid covering the hole at the base of the valve.

Local anaesthesia is not mandatory. Insert the needle in the lesion, open the valve by pressing down the valve piston, hold down the piston continuously during aspiration. Pass the needle tip through the whole target lesion by pulling out and advancing the needle by tiny movements in various directions, generally begin the aspiration at the more superficial part of the lesion and advance to the deeper parts during your multiple needle movements.

Stop aspiration by releasing the piston when desired tissue becomes visible in the transparent needle cone or if blood or any other fluid becomes visible. Avoid passing the biopsy amount through the valve in order to avoid material loss and to avoid contamination of the valve, requiring a complete cleaning procedure. By releasing the piston, underpressure becomes equalized to ambient pressure via the hole at the valve bottom. Only then pull the needle out of the aspiration target.

5 Slide production

Now you must work quickly, to avoid coagulation or drying or degeneration of your biopsy specimen. Keep the valve closed, remove the needle from the valve, then remove the syringe and the blocking stick both together from the valve, let the blocking stick fall on the table out of the syringe, then put the syringe on the needle, filled by air as it was before, and blow out multiple small biopsy specimen droplets on the slides prepared before the aspiration procedure (let the outlet of the needle look downwards), then quickly spread the material on the slides by carefully pressing a cover slide over the biopsy droplets. Identify the slides as needed with a pencil or a special pen.

6 Cleaning

The valve must be cleaned as soon as possible after contamination in order to avoid drying of the pollutant.

- minimal or no visible contamination: purge the female outlet using a cotton swab, then fill this female outlet with disinfection spray, blow that through the valve after pressing down the valve piston.
- heavy contamination: purge the female outlet using a cotton swab, fill a syringe with water, blow the water through the valve after pressing down the valve piston (or let run tap water through the female outlet out of the male outlet after pressing down the valve piston). Then remove the screw at the bottom of the valve, remove the spring out of the bottom of the valve, let run tap water from the valve bottom through the valve out of the male outlet without pressing down the valve piston. Or fill a syringe with water and connect it to the male outlet by an adapter, e.g. a three-way cock, blow the water through the valve. Then clean the valve with demineralized water as described above, then put the valve in ethanol or methanol for removing humidity, then after air-drying lubricate the valve as described below.

If, after cleaning and lubrication, the valve piston does not move gently, do not try moving it by force, but send your valve in for repair.

7 Lubrication

The valve should be lubricated after 10 to 20 aspiration procedures or if you do not feel a "viscous" movement of the piston as originally. Tightness of the valve is produced by the lubrication film on the piston. Without lubrication the valve will be destroyed gradually.

Put one droplet of our special lubrication oil on the upper part of the piston at the top of the valve, press and release the piston multiple times until the lubricant has coated the whole piston (you feel this "viscous" movement of the piston). You may need to repeat this procedure with another oil droplet.

Our special vacuum oil resists to temperatures like during sterilization. Other oils may not warrant tightness.

8 Function check

Prepare the valve for aspiration as described above, with a 20ml syringe. After 3 minutes remove the blocking stick without pressing down the valve piston. If the syringe piston goes back to less than 3 ml, the valve is OK. On delivery by us all valves are so tight, that after a test time of 10 minutes the syringe piston returns to 0.

9 Needles

It is recommended to use only needles with transparent needle cones (compare above puncture procedure). All standard venipuncture needles can be used. Long needles of equivalent types are sold as *Chiba* or *Quincke* needles. The recommended diameter for FNAC is 0.5 to 0.7 mm. Heavily fibrotic tissue may require smaller needles of 0.4 mm. Heavily perfused tissue like the thyroid gland or the kidney may require lower underpressure (use 10 ml syringes instead of 20 ml).

10 Syringes

All standard syringes with *Luer* or *Luer-lock* cones may be used. Some syringes lose their underpressure when you pull out the syringe piston out of axis. Some Syringes with an additional sealing ring on the syringe piston retain the underpressure better. You may have to test the underpressure with a new syringe type (see above function test). It is recommended to test the underpressure always just before the puncture (prepare your valve and then just before puncture try to pull out the syringe piston a little bit: if you feel enough resistance, all is OK). Syringes may be reused for the next puncture, if not contaminated.