Chapter 1

# Introductory Chapter: Bedside Procedures in Critical Care Unit

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Additional information is available at the end of the chapter

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## 1. Introduction

The number of procedures performed in an operating room (OR) or interventional radiology (IR) is high; therefore, the performance of bedside procedures may decongest those services and be more rapidly performed by the team that is closest to the patient. It was also demonstrated that it can prevent serious adverse effects related to the transportation of patients to OR or IR. The price for radiology performed procedures is also higher compared to those performed at the bed of the patient as there are specific charges for special radiological equipment, radiologist's time and procedural space [1].

Some of the procedures performed at the bed of the patient may need ultrasound guidance. Ultrasound should be available in the ICU department and portable devices can guide paracentesis, thoracocentesis, pericardial puncture, abscess drainage, insertion of venous central line, or insertion of an arterial line. In the new years, hand-held ultrasound machines made the procedures even more easy to perform as it can be used for the guidance of vascular access or fluid removal from the pericardium, pleura, abdomen, cystostomy, etc. The placement of inferior vena cava filters is performed in patients with deep vein thrombosis and contraindication to anticoagulants or recurrent thromboembolism after correct anticoagulation. Filters can be implanted at the bed of the patient using intravascular echography, available as rotational or sectorial ultrasound. Transesophageal echocardiography can also be used at the bed of the patient to guide implantation of chemotherapy chambers or chambers for continuous high doses of diuretics [2].

Many procedures utilize special available kits for central venous catheter placement, arterial line placement, pericardiocentesis (**Figure 1**), pulmonary artery catheterization, percutaneous tracheostomy, temporary pacemaker insertion (**Figure 2**), port-a-cath (**Figure 3**) lumbar puncture or suprapubic cystostomy. These kits include drapes, gloves, caps, gowns and masks for

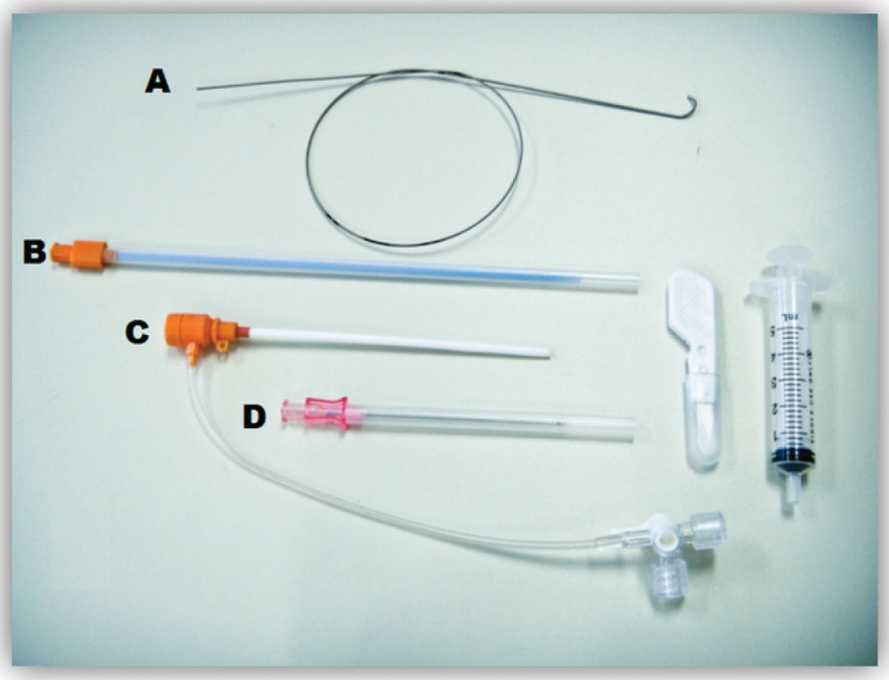


**Figure 1.** Pericardiocentesis kit: (A) atraumatic metallic guidewire that enters inside the pericardium after the puncture with the needle; (B) dilator—is stiff, made of plastic and dilates the orifice made by the needle; it permits the introduction of the aspiration catheter; (C) aspiration catheter; and (D) needle.

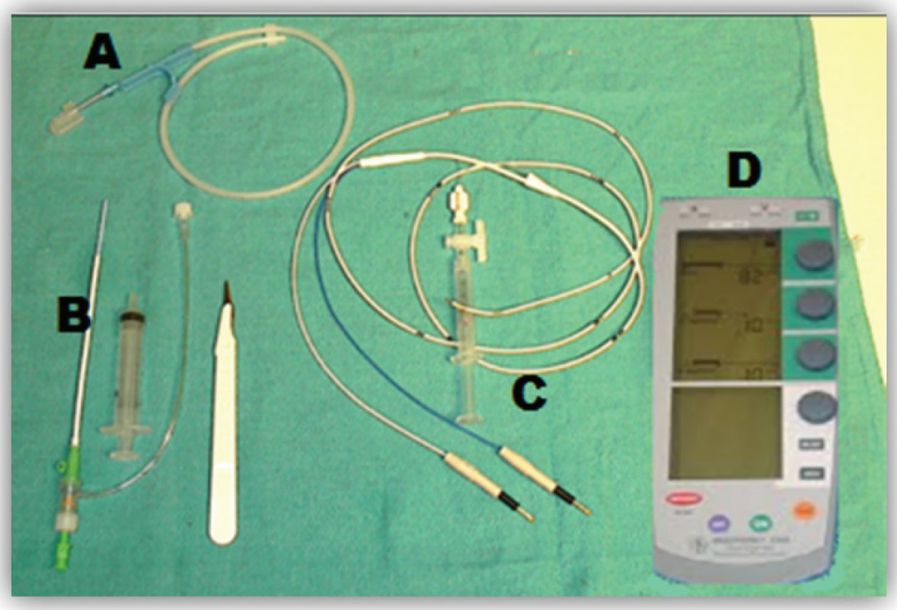


**Figure 2.** Temporary pacemaker insertion kit: it contains: (A) an atraumatic guidewire that will be introduced in a central vein: femoral, jugular or subclavian, (B) a plastic introducer that will remain inside the vein during the temporary stimulation of the heart, (C) a transvenous lead that will be fixed at the level of atrial or ventricular myocardium and will be used to stimulate the heart, and (D) an external pacemaker that will deliver the stimulation to the heart through the transvenous lead.

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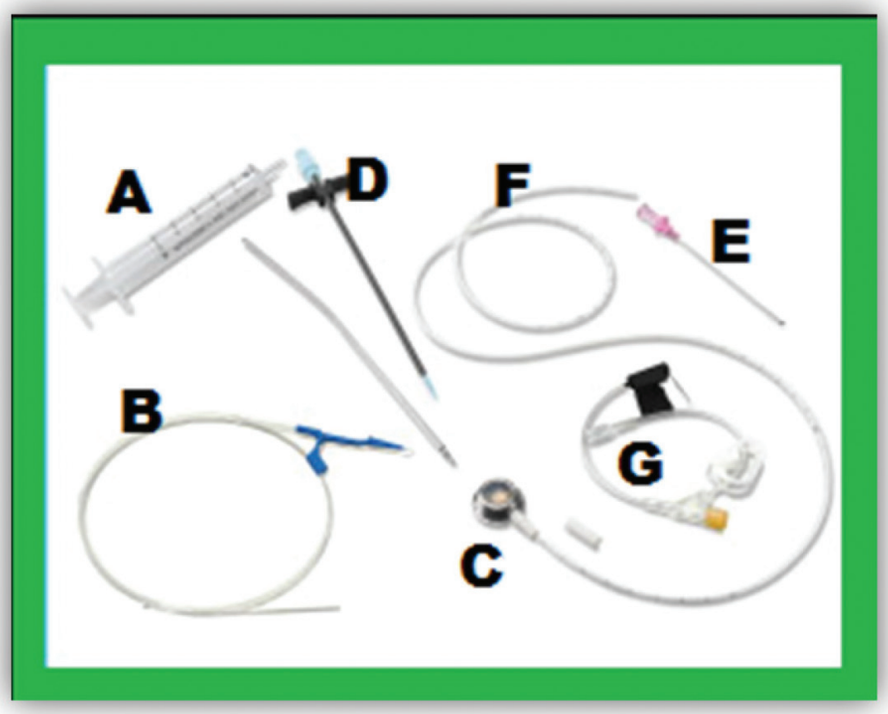


**Figure 3.** Port a cath Implantable Venous Access System kit. It can be used for chemotherapy administration, high doses of diuretics in terminal heart failure patients, parenteral nutrition, and blood sampling. (A) Syringe, (B) atraumatic metallic catheter that will be introduced through the cephalic, jugular or subclavian vein, (C) the chamber for therapy injection, (D) dilator used to access the central vein, (E) needle for venous puncture, (F) polyethylene catheter tubing that will be inserted at the junction between the right atrium and superior vena cava, and (G) 90-degree winged infusion set.

the doctor, betadine, needles, catheters, blades, syringes, drainage catheters, bags, tubes, lidocaine with and without adrenaline, for the procedure itself. The kit provides maximal barrier precautions and also lowers the rate of iatrogenic infection.

## 2. How to perform bedside procedures?

Before deciding to perform a procedure at the bedside of the patient in ICU, we should limit visitors to enter in the immediate surrounding of the patient or even in the entire unit during the performance of the procedure. This ensures a sterile field and also provides measures of privacy. On the other hand, we should separate the procedure and the patient from the rest of the ICU to minimize distractions and disruptions. This can be done by curtains or temporary partitions or by changing the room of the performance. Nurses should be present during the procedure, and they should be familiar with the technique of the procedure. Most of the time adequate sedation is necessary with midazolam, propofol and pethidine. Doses for analgesia and sedation should be prescribed by the doctor, but the volume of the vial and dilution should be known by the nurse. Prior to assisting in a new procedure, nurses, residents, students and other staff members should receive adequate training with a prior period of observation when there is no anterior experience [3].

For the safety of the procedure, adequate preparation is mandatory, with prior sedation, intravenous access, initial preparation of the kit and suitable monitoring. Specific sites for venous access are preferred in the function of the bedside procedure being performed. Advanced airway equipment should be available, especially when the bedside procedure is performed in an unstable patient. Whenever possible, informed consent should be obtained from the patient before the beginning of the procedure, and in case of unstable patients, consent should be obtained from a family member or tutor of the patient. All the staff members should be aware of the nosocomial infection risk. This risk can be reduced by proper hand hygiene, the use of antiseptic skin agents, selecting a good puncture site, and the use of sterile drapes for an aseptic technique [4].

Proper hand hygiene, appropriate site selection, use of appropriate skin preparation agents, and an aseptic technique with a full body drape during device insertion have been shown to reduce the rate of nosocomial device-related infections.

In urban non-academic, rural and community hospitals, intensivists are more likely to perform bedside procedures as compared to their urban academic counterparts. This is likely because of a lack in interventional radiology departments and performance of the procedure at the bed of the patient may be particularly important [5].

We are of the strong belief that hospitalization costs can be reduced by doing the procedures at the bedside of the patient rather than referring them to the surgery department or interventional radiology.

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