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SHORT COMMUNICATION

Manuel Morales
Javier Dorta

Percutaneous insertion of Hickman catheters while the patient is in bed: a simplification of the technique

M. Morales (✉)[1] · J. Dorta
Divison of Medical Oncology,
Department of Internal Medicine,
Hospital Nuestra Señora de la Candelaria,
Santa Cruz de Tenerife,
Canary Islands, Spain

Mailing address:
[1] P.O. Box 430,
E-38080 La Laguna, Tenerife,
Canary Islands, Spain

Abstract Central-venous long-term catheters are an important tool for patients undergoing anticancer chemotherapy. To circumvent dependence on the surgical department and their waiting lists, catheters were placed while the patient was in bed in the ward of a general oncology unit. A total of 84 single-lumen Hickman catheters were inserted with aseptic technique, percutaneously in this setting. The complication rate after the insertion was low, with only 1 case of pneumothorax (1.2%) and 7.1% of patients suffering arterial puncture. The placement of Hickman catheters while the patient is in bed is a safe procedure that can save hospitalization costs and permits the insertion at the optimum time in the care of the patient.

Key words Hickman catheter
Vascular access · Central-venous catheters

Introduction

The relative safety of the technique, patients' comfort, the ease of drug administration and the availability of devices for virtually every need have made central venous catheterization a routine procedure for the great mejority of cancer patients [3]. Hickman catheters are tunnelled, cuffed, silastic, right-atrial catheters, which are placed under sterile conditions by a surgeon using local anaesthesia (general anaesthesia in the case of children) in the operating room. The technique of insertion may be open (i.e. the vein is exposed and the catheter is inserted directly into it) of closed (i.e. a guide wire is introduced into a vein that is not exposed and the catheter placed through a peel-away sheath). Before leaving the operation room, the surgeon should confirm the correct catheter position fluoroscopically and demonstrate free blood withdrawal through the lumen(s) of any right-atrial catheter [4]. In order to avoid the waiting lists of the surgical department, we performed the insertion of Hickman catheters while the patients were in bed in a general oncology unit, without fluoroscopic guidance.

Materials and methods

Informed consent was obtained from all patients. All procedures were performed by the same medical oncologist, with the assistance of a registered nurse at the patient's bedside. The material used was the simple-lumen Hickman (BARD) catheter and insertion kit, which contains: one 12-ml disposable syringe, one extra-thin-wall needle, one flexible stainless-steel J-guide wire with tip straightener, one peel-away introducer with tapered vessel dilator and one tunnelizer.

The staff involved were provided with gloves, masks and gowns, the patient's skin was disinfected with povidone-iodine and the operating surface was limited with sterile covers. The patients were asked to keep their heads turned to the left during the procedure. The right subclavian approach was used whenever possible. When there was the need to leave the subcutaneous tunnel outside a radiation field, in women with cancer of the right breast, the left subclavian approach was used. When it was impossible to canalize the right subclavian vein, the right internal jugular vein was canalized using the central approach.

The insertion procedure was performed as follows. After the local administration of 2% xylocaine anaesthesia, an infraclavicular venous puncture was made. Once the vein had been entered, the needle was held in place and the syringe removed. At this time the patient was asked to turn the head to the right, so that the entrance to the right jugular vein could be avoided; the J-guide wire was passed into the vein and the needle removed over the wire. The patient was then asked to turn the head to the left

again. A 20-ml syringe filled with 2% xylocaine was used to anaesthetize the skin and subcutaneous tissue between the lower third of the sternum and the entrance of the guide wire. A 4-mm cut was made through the skin at the entrance of the guide wire and through the skin over the lower third of the sternum. The catheter was attached to the tunnelizer and the tunnelizer was introduced through the wound in the the skin over the sternum and advanced through the subcutaneous tissue to the wire entrance. The catheter was passed through the tunnel and the Dacron cuff placed 2 cm from the chest wound. The catheter was placed on the anterior chest wall to simulate its intravascular position and a 45°-angle cut made at the distal tip of the catheter, at the level of the third intercostal space. The vessel dilator and and peel-away sheath unit was advanced over the J-guide wire, leaving approximately 6 cm exposed. The J-wire was withdrawn, a syringe was connected to the vessel dilator and blood was aspirated to ensure intravascular location. The vessel dilator was withdrawn and a thumb held over the exposed orifice to prevent air aspiration. The catheter was inserted into the sheath and advanced through it into the vein. The sheath was then stripped away as the catheter advanced centrally. Once the catheter had been completely introduced, the infraclavicular incision was closed with one point of nonabsorbable suture and the catheter exit was reduced using the same suturing technique. During the insertion period the catheter was clamped. After the placement, blood was aspirated to ensure once more the intravascular location of the catheter. After that, the catheter was flushed with 3–4 ml saline and with 2.5 ml 1% heparin. The catheter was clamped and locked with the cap. A sterile dressing covered the catheter when it was not in use. Posteroanterior and lateral X-ray films of the chest were obtained to check the location of the catheter's tip and ensure the absence of pneumothorax.

Results

A total of 84 single-lumen Hickman catheters were placed in 83 patients with solid tumors, between 29 August 1990 and 16 October 1992. The patients' characteristics, insertion routes and complications are shown in Table 1.

Table 1 Patient characteristics

No. of patients/catheters	83/84
Age range (mean) (years)	14–71 (47)
Sex distribution	
Female	56 (66.7%)
Male	38 (33.3%)
Insertion route	
Right subclavian vein	62 (73.8%)
Right internal jugular vein	16 (19.1%)
Left subclavian vein	6 (7.1%)
Insertion complications	
Pneumothorax	1 (1.2%)
Arterial puncture	6 (7.1%)

Discussion

Central-venous long-term catheters are an important tool in the management of patients undergoing anticancer chemotherapy. The placement of these catheters is usually performed by a surgeon in an operating room with fluoroscopic guidance. In some health-care systems in which there is overcrowding of the hospitals, the waiting lists for surgical services are very long. To overcome this situation, we have started to insert Hickman catheters while the patient is in bed in our oncological unit. With the success of the initial cases, this is now the common policy in our hospital. Sixty-two catheters (73.8%) were inserted through the right subclavian vein, which was chosen because if there was failure of canalization the right internal jugular vein could be canalized; this avoided the risk of bilateral pneumothorax which could occur if the left subclavian approach was attempted.

The complications of the insertion were arterial puncture in 6 cases (7.1%), without preventing the same approach for canalization, and 1 case of pneumothorax (1.2%). This complication rate is low. Brothers and co-workers and Brincker and Seater reported rates of pneumothorax during percutaneous insertion of 2.4% and 2.6% respectively [2, 1].

Summarising, the placement of Hickman catheters while the patients are in bed is a safe procedure, which can be performed by a skilled physician. This avoids dependence on surgical services, hospital costs can be saved and the catheters can be placed at the optimum time in the patient's management.

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