SHORT REPORT

Peripheral Access for Implantable Venous Access Device

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Objective. To assess the success of peripheral venous access for implantation of venous access device in large series of patients with the aim of avoiding central venous puncture with its potential complications and costs.

Design. Retrospective cohort study.

Methods. During a 4-year period (January 2001–December 2004), 302 consecutive patients underwent implantation of a venous access device. The first choice was peripheral venous access. If this failed the subclavian vein was punctured for access.

Results. Access was gained via the cephalic vein in 246 patients (81%), in eight patients via other peripheral veins (3%) and the subclavian vein was punctured in 48 patients (16%). Pneumothorax occurred in two patients who underwent subclavian vein puncture (0.7% of all and 4% of patients with subclavian vein puncture) and was managed by insertion of a chest drain. There were no other perioperative complications. The average cost was 680 Euros for implantation via a peripheral vein and 993 Euros when the subclavian vein was used for access. Mean operating time for all 302 procedures was 36 min.

Conclusions. Peripheral venous access was possible in 84% of our patients and may be the access of first choice for implantation of venous access device to avoid central venous puncture with its potential morbidity, rare mortality and additional costs.

Keywords: Venous access; Implantation; Venous access device; Pneumothorax.

Introduction

Central venous access devices are used in patients needing repeated central venous access for administration of cytotoxic and other drugs and to obtain blood samples for analysis. The venous access device can be placed peripherally or in a central vein. Central venous puncture has its morbidity (mainly pneumothorax) and a very low mortality. Peripheral access is not always possible.

Our aim was to assess the success rate of peripheral venous access in order to avoid central venous puncture and its complications and costs.

Material and Methods

Three hundred and two consecutive unselected patients underwent implantation of a venous access device during a 4-year period (1st January 2001–31st December 2004).

The study population comprised 150 female patients and 152 men. The age of the patients ranged from 21 to 73 years (mean 64.5 years). In 98% of the patients the underlying disease was malignant and chemotherapy was required. The procedure was performed under local anaesthesia (280 patients or 93%) unless another procedure was performed at the same time (22 patients or 7%) demanding general anaesthesia. Single shot antibiotic prophylaxis was given as a routine (cefuroxime). The infracavicular incision was either transverse or in the deltoideopectoral sulcus depending on the surgeon’s preference. As a first choice the cephalic vein was chosen for catheter insertion. As a second choice thoraco-acromial vein branches or muscular vein branches were used for insertion. If there was no peripheral vein for access then the subclavian vein was punctured and the catheter was inserted with an introducer set. Implantation was done in a standard manner according to the

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instruction for the use of PORT-A-CATH (SIMS Deltec Inc., St Paul, MN, USA). For the correct placement of the catheter an image intensifier was used. Subcutaneous tissue and skin was closed in two layers. No vacuum wound drain was inserted. Whenever the subclavian vein was punctured a postoperative chest X-ray was performed. The all-inclusive price for an ambulatory PORT-A-CATH (PAC)-implantation was 680 Euro. Additional costs include introducer sets costs (47 Euro per set), additional chest X-rays (50 Euro each), insertion of chest drain (406 Euro all-inclusive), and 630 Euro per hospitalisation day. Follow-up management was by the oncologists in all patients.

Results

In 246 patients (81%) the cephalic vein could be used for PAC-implantation. In eight cases (3%) other peripheral veins were usable; in two cases thoraco-acromial and pectoral muscular venous branches. In 48 cases (16%) the subclavian vein had to be punctured for access. From these 48 punctures pneumothorax resulted on two occasions (0.7% of all and 4% of patients with subclavian vein puncture). These two patients were managed by insertion of a chest drain. In the first patient it was possible to remove the chest drain only after 6 days, the second patient suffered from chronic obstructive airway disease and the chest drain had to be maintained for 9 days due to a prolonged air leak. There were no other peri-operative complications. There was no peri-operative mortality.

The average costs per patient was 680 Euro for implantation via a peripheral vein. Average costing per patient was 993 Euro when the subclavian vein was used for access, according to the costs as defined in methods section.

In the first month after the operation there was no other complication in addition to the cases of pneumothorax. There was no case of infection, thrombosis or catheter dislocation.

Mean operating time for all 302 procedures was 36 min. The mean operating time in the peripheral vein group was 33 min and in the subclavian vein group 50 min.

Discussion

The infraclavicular venous PAC can be implanted via peripheral veins, mainly the cephalic vein but also via thoraco-acromial, basilic and muscular vein branches or left persistent superior vena cava. Central venous access can be done via the subclavian and jugular vein. Other routes of access are also possible, for example via the long saphenous vein. Some centres prefer peripheral access, some use mainly or purely the subclavian vein.1–6

A prospective randomised trial comparing implantation of PAC via cephalic versus subclavian vein showed no significant differences concerning associated morbidity, technical failure, operating time and patient acceptance in a total of 50 patients.7

However, incidence of pneumothorax goes up to 4.7% when subclavian vein is punctured.8 Severe and lethal complications resulting from subclavian vein puncture exist including pseudoaneurysm, perforation into neighbouring structures and air embolism.7–9

In our series, pneumothorax occurred only when the subclavian vein was punctured. In 84% of patients implantation was possible via peripheral access. Mean operating time, with that peripheral implantation success rate of 84%, was only 36 min. Costs were higher when the subclavian vein was punctured due to additional equipment, X-rays, complications and hospitalisation time.

We, therefore, conclude that peripheral access is possible in the majority of patients. Morbidity, mortality and costs resulting from subclavian vein puncture can be avoided using peripheral access. We recommend peripheral access as first choice for implantation of peripheral venous access device.

References


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