

SUBCLAVIAN CATHETERS AS TEMPORARY VASCULAR ACCESS

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ABSTRACT

We reviewed our experience with subclavian vascular catheters (SVC) as temporary vascular access in the 18 month period 1 January 1984 – 30 June 1985. 37 consecutive patients using 49 vascular catheters received a total of 461 haemodialyses. Only 8 patients had acute renal failure. The rest were endstage renal failure (ESRF) patients awaiting definitive vascular access. Most of these latter patients were ambulant and were generally dialysed on an outpatient basis. 27 episodes of clinical septicaemia occurred and was the ONLY significant complication encountered. All but one patient responded to empiric therapy with cloxacillin \pm gentamicin and removal of the catheter. We conclude that SVC's are safe and suitable for use on an extended short-term basis especially in ESRF patients with vascular access problems.

Key Words: Subclavian catheters, vascular access, renal failure.

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INTRODUCTION

In our haemodialysis unit, the numbers of NEW patients with both acute renal failure (ARF) and endstage renal failure (ESRF) presenting for haemodialysis therapy had quadrupled between 1979 and 1984 (Table 1). A similar trend was also seen for the total number of haemodialyses performed in each year. There was, however, no concomitant increase in the number of both medical and technical staff in the unit.

To compound the situation, our arteriovenous shunts and arteriovenous fistulae were performed mainly by surgical medical officers rotating through the Urology Unit and done during their spare time.

From 1978, subclavian vascular catheters (SVC) became widely available for angioaccess for haemodialysis and, indeed, revolutionised technology related to acute vascular access devices (1-4). Given our problems, we decided to utilise SVC's as an interim measure for ARF and ESRF patients whilst awaiting creation and/or maturation of a definitive vascular access. Due to the expensive cost of SVC's, we also continued to utilise single-use and indwelling femoral catheters during this period. We review here our preliminary experience with SVC's during the 18-month period between 1 January 1984 and 30 June 1985.

MATERIALS AND METHODS

37 consecutive patients haemodialysed via SVC's were reviewed. ARF patients who were dialysed via SVC's

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Table 1.
HAEMODIALYSIS UNIT – GENERAL HOSPITAL
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YEAR	1979	1980	1981	1982	1983	1984
NO OF NEW PATIENTS						
ARF	22	39	22	51	58	58
CRF	44	58	87	121	99	115
HOME H/D*	2	11	16	34	49	50
TRANS-PLANT	21	25	22	36	22	26
NO. OF H/D*	4032	6661	9275	18,055	20,026	18,727

* H/D – HAEMODIALYSIS

outside of the haemodialysis unit were not included. In each case, the SVC was inserted by either the first author or a trained medical officer under supervision. A 25 cm. Medicath central venous catheter (ordinary use) was first inserted via the usual infraclavicular approach under strict aseptic technique by the bedside. Using a guide-wire, a SVC (Vascath) was then substituted. The SVC position was checked with a chest X'ray prior to its use for haemodialysis.

In the majority of patients the SVC was used for outflow and a separate short needle for venous return was also inserted at each dialysis to ensure adequate dialysis. Lumen patency of the SVC between dialyses was maintained by instilling 3000 – 5000 units of heparin sodium prior to capping – off of the SVC.

RESULTS

49 SVC's were inserted in 37 consecutive patients during the study period – 8 with ARF and 29 with ESRF. Complications related to the insertion procedure per se in-

cluded one inadvertent arterial puncture and one haemothorax. As expected, the ARF patients had a poorer overall outcome with 6 deaths in contrast to 4 in the ESRF group. All deaths were due to the underlying disease and occurred independently of the SVC.

Majority of patients (28) had ONE cannulation, 7 had TWO cannulations, 1 had THREE cannulations and 1 patient required a FOURTH SVC due to repeated failure of definitive vascular access surgery. No significant technical difficulty was encountered in those requiring repeated cannulations.

A total of 461 dialyses were performed with an average of 9.4 dialyses per catheter. The SVC's were left insitu for a period ranging from 2 – 82 days (total 1,133 CVC-days) with an average of 25 days per catheter.

All ARF patients were inpatients. Only 7 ESRF patients remained in hospital, mainly for geographical reasons. The rest were dialysed on an outpatient basis. The 7 accidental fall-outs of SVC's occurred early and was related to poor anchoring technique. However, this did not give rise to any significant problem.

27 episodes of clinical septicaemia were encountered and presented as fever with or without chills and rigors. 17 of these yielded positive pre-antibiotic cultures — either from pus around SVC sites, blood cultures or SVC tips (Table 2). 6 were culture-negative and the results of the other 4 were not traceable. As far as possible, each septicaemic episode was managed by prompt catheter removal and commencement of empirical antibiotic therapy with cloxacillin ± gentamicin. Antibiotics were subsequently adjusted according to culture and sensitivity results. Of interest, 6 of these episodes responded promptly to parenteral antibiotic therapy alone and the SVC was only removed at a later date, with NO further complications.

DISCUSSION

There is no doubt that SVC's provide immediate vascular access for renal failure patients requiring dialysis, both in the acute and chronic setting (1-4). For the ESRF patient who has vascular access problems, it can be used for extended periods until such time when definitive surgical angioaccesses are mature. Such patients remain ambulant and can be treated on an outpatient basis, thereby improving rehabilitation. Multiple cannulations are also feasible (2) and pose little technical difficulty to the ex-

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Table 2.
SVC INFECTION: BACTERIAL ISOLATES

Staphylococcus epidermidis	6
Staphylococcus aureus	3
Mima species	3
Acinetobacter	2
Enterobacter	1
Flavobacterium	1
Group D nonhaemolytic streptococci	1
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perienced operator. Nevertheless, complications related to the insertion technique are not totally preventable even in the best of hands (5).

The other group of complications is related to the presence of a foreign body in the subclavian vein. Sepsis is the major setback of indwelling vascular catheters with reported incidences ranging from 2.3% in Vanholder's series (5), 10% in Uldall's series (2), 47% in Lens' series (6) up to 100% in Honkanen's (7) and Hurst's (8) series. Our incidence of sepsis, although unacceptably high at 55%, no doubt reflects the high incidence of breakdown in aseptic technique by staff coping with the tremendous patient load.

Additional complications of central venous catheters include acute infective endocarditis, superior vena cava thrombosis, infected pulmonary embolism, lung abscesses, pneumonia and even deaths (1-5). We are fortunate that we have encountered none of these latter complications in our small series.

We therefore conclude that SVC's are safe and suitable for use both for short-term and for extended periods in renal failure patients requiring haemodialysis.

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