POSTOPERATIVE DEEP-VEIN THROMBOSIS IN ASIAN PATIENTS IS NOT A RARITY

A PROSPECTIVE STUDY OF 88 PATIENTS WITH NO PROPHYLAXIS

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Postoperative deep-vein thrombosis (DVT) is believed to be rare in Asians. We studied 88 consecutive patients in Malaysia who had operations for fracture of the proximal femur or for total hip or knee replacement. No patient had prophylaxis against DVT; bilateral ascending venography was performed between six and ten days after operation.

A total of 55 patients (62.5%) showed venographic evidence of DVT. The prevalence was greatest after total knee replacement (76.5%), less after total hip replacement (64.3%) and smallest in the fracture group (50%). One patient developed symptomatic pulmonary embolism.

In contrast to other reports from Asia, we found an incidence of postoperative DVT which is similar to that reported in Western populations. This suggests that the present practice of withholding routine prophylaxis against thromboembolism in Asian patients undergoing high-risk orthopaedic procedures should be reconsidered.

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In Western countries, deep-vein thrombosis (DVT) occurs in 45% to 84% of patients after hip and knee surgery in the absence of prophylaxis (Stulberg et al 1984; Hull and Raskob 1986), but there is a firm belief that the complication is rare in Asian patients. The very large number of publications from the West on thromboembolic disease contrast with very few from Asia, especially in orthopaedic journals. The belief that thromboembolic disease is rare and the Asian aversion to post-mortem examination have contributed to lack of awareness in Asia of a condition that is a common cause of preventable hospital deaths in the West (Hull and Raskob 1986).

In our unit, three patients had postoperative pulmonary embolism over a two-month period in 1992, and one of the authors (KSD) noted that a substantial number of patients complained of leg and foot swelling after hip or knee arthroplasty. These observations prompted us to review the literature and to study the incidence of postoperative DVT in patients in Malaysia who represented the three major Asian ethnic groups: Malay, Chinese and Indian. We used ascending phlebography to determine the incidence of postoperative DVT in patients undergoing high-risk surgery of the lower limb.

PATIENTS AND METHODS

The prospective study included all patients undergoing surgery for fractures of the proximal femur or for total hip or knee replacement and was approved by the Hospital Medical Research Ethical Subcommittee. From January 1993 to December 1993, 99 consecutive patients aged 20 years or more were enrolled in the study. Informed consent was obtained for postoperative contrast venography. Patients with a contraindication to venography such as allergy to iodine, pregnancy or hepatic or renal failure were excluded.

For each patient a completed protocol included demographic details, the nature and duration of the surgery, the type of anaesthesia and any risk factors. Clinical signs of DVT and the results of venography were recorded. No type of prophylaxis against DVT was used in any patient; this was the routine practice in our unit at that time.

The risk factors which we recorded included immobility, heart failure, obesity, previous DVT, oestrogen therapy, diabetes mellitus, hypercholesterolaemia and the presence of

adenocarcinoma. The clinical signs documented were Homans' sign, prominence of superficial veins, leg and ankle swelling, skin discoloration and fever.

After operation, the patients were observed closely for signs of DVT or pulmonary embolism. Bilateral ascending contrast venography was performed between day 6 and day 10 after operation. When there was suspicion of clinical DVT or pulmonary embolism the venography was done earlier. We used the technique described by Rabinov and Paulin (1972) and the criteria for the diagnosis of thrombosis described by Lensing et al (1992). The venograms were interpreted as being normal, showing thrombosis, or inadequate for interpretation. Each series of venograms was independently interpreted by two radiologists, and any difference of opinion was discussed to reach a consensus. Thrombi confined to the calf were classified as distal and those involving the popliteal or femoral vessels were classified as proximal. We did not perform routine V/Q scans for suspected pulmonary emboli.

Of the 99 patients enrolled, one died on the third postoperative day from probable pulmonary embolism and had no venography. Ten other patients with inadequate venograms were excluded from the study. This left a total of 88 patients with satisfactory venograms for full analysis.

Of the 88 there were 61 women and 27 men; their mean age was 64 years (22 to 92). There were 57 Chinese, 16 Indians and 15 Malays; 40 had surgery for fracture of the proximal femur, 34 had total knee replacement (6 bilateral) and 14 had a total hip replacement. Operations for fracture of the proximal femur included hemiarthroplasty (11), gamma nailing (19), dynamic hip screw fixation (7) and cannulated screw fixation (3). Forty patients had general anaesthesia and 48 spinal or epidural anaesthesia.

Statistical analysis. We used a two-tailed *t*-test for two independent samples to compare two means and an uncorrected chi-squared test of significance for categorical data. The significance level was set at 0.05. We also used Bartlett's test where relevant to assess the homogenicity of variances in the two groups.

RESULTS

Of the 88 patients with adequate venograms, 55 (62.5%) showed evidence of DVT, of whom 44 had distal thrombi (80%) and 11 had proximal thrombi involving the femoral or popliteal vessels. No patient had involvement of the iliac vessels. The incidence of DVT varied for each operative group, ranging from 50% of the 40 with a fracture of the proximal femur to nine of the 14 (64%) who had total hip replacement and to 76.5% of the 34 with total knee replacement (Table I). All six patients who had bilateral knee replacement showed evidence of deep-vein thrombosis.

Table I. The incidence of deep-vein thrombosis (DVT) in the three groups of patients

Operation	Number	Number with DVT	*Percentage of DVT*
Total knee replacement	34	26	*76.5*
Total hip replacement	14	9	*64.3*
Fixation of proximal femoral fracture	40	20	*50*
Total	88	55	*62.5*

One patient, a 70-year-old woman, developed clinical features suggestive of pulmonary embolism on the fifth postoperative day after a total knee replacement. A V/Q scan showed mismatched multiple ventilation/perfusion segmental defects involving both lungs, and subsequent venography showed DVT involving the popliteal and femoral veins.

Of the 55 patients with venographic DVT only 19 had one or more clinical signs of DVT (34.5%). Of these 19 patients, eight had proximal and 11 had distal thrombi. Only four patients (7.3%) had three or more clinical signs suggestive of the probability of DVT; two of these had proximal and two had distal thrombi.

In our small series, we found no statistical association between the incidence of venographic DVT and gender, ethnicity, type of anaesthesia or duration of surgery (Table II). We also found no differences in the mean age of the patients or the mean duration of surgery in those patients with and without DVT.

There were no major complications of venography. Two patients had some transient foot swelling and pain due to extravasation of contrast medium into the soft tissues.

DISCUSSION

Tinckler (1964) drew attention to the apparent rarity of postoperative DVT and pulmonary embolism in the races of South-East Asia. Since then, a few studies from Asia have shown a varying incidence of these complications. Three were of general surgical patients, in whom ^{125}I-labelled fibrinogen was used to detect thrombosis (Cunningham and Yong 1974; Nandi et al 1980; Inada et al 1983). The incidence of DVT in these studies ranged from 2.6% to 15.3%. Another study of patients after gynaecological operations, also using ^{125}I-labelled fibrinogen, showed an incidence of 2.4% (Chumnijarakij and Poshyachinda 1975). Four other studies of orthopaedic patients undergoing surgery for proximal femoral fractures or total hip replacement used venography to detect thrombosis. The incidences of DVT reported in these were 53.3% (Hong Kong), 4% (Thailand), 10% (Korea) and 9.7% (Singapore), respectively (Mok et al 1979; Atichartakarn et al 1988; Kim and Suh 1988; Mitra, Khoo and Ngan 1989).

Our experience is that DVT and pulmonary embolism are more common than generally believed; the discrepancies in reported incidences led us to carry out this prospective trial. We included three types of orthopaedic operations in which the incidence of thrombosis is high. Our study has shown a 62.5% venographic incidence of postoperative DVT. This is

Table II. Comparison of demographic and clinical factors in the 88 patients having venograms. Percentages are calculated on numbers in the original groups

	Venograms positive (n = 55)	Venograms negative (n = 33)	p value of difference
Age in years (mean ± SD)	63.2 ± 15.4	66.1 ± 16.9	0.4130
Gender (number; *percentage*)			
Male	16 (*59.3*)	11 (*40.7*)	0.6761
Female	39 (*63.9*)	22 (*36.1*)	
Ethnicity (number; *percentage*)			
Malays	9 (*60.0*)	6 (*40.0*)	0.8454
Chinese	35 (*61.4*)	22 (*38.6*)	
Indians	11 (*68.8*)	5 (*31.2*)	
Type of operation (number; *percentage*)			
TKR	26 (*76.5*)	8 (*23.5*)	0.0378
THR	9 (*64.3*)	5 (*35.7*)	
Fractured femoral neck	20 (*50.0*)	20 (*50.0*)	
Type of anaesthesia (number; *percentage*)			
General	27 (*67.5*)	13 (*32.5*)	0.3765
Regional	28 (*58.3*)	20 (*41.7*)	
Duration of operation in min (mean ± SD)	120.6 ± 53.5	112.8 ± 49.4	0.4990

similar to that reported from the West (Lotke et al 1984; Hull and Raskob 1986) and also from Hong Kong (Mok et al 1979). We are unable to explain the discrepancy between our findings and those reported from Korea, Singapore and Thailand. Chau et al (1991) from Hong Kong showed an increase in the incidence of pulmonary embolism in a retrospective study of post-mortem material over 15 years. They speculated that this was due to an increase in the elderly population, to a more aggressive approach to disease by surgeons who operate on patients with a poorer prognosis, and also to the westernisation of the Chinese diet in Hong Kong. This may also be true of our population, but fails to explain the lower incidence in Thailand, Korea and Singapore. The age of the patients cannot explain the discrepancy; the mean ages of patients in these studies were very similar. The diet of the various nations differs to some extent, as does the diet of each ethnic group in each nation, but there is no evidence as to the effect of these variations on thromboembolic disease.

The other studies from Asia did not consider pulmonary embolism. Two of our patients had pulmonary embolism: one was excluded from the study because the patient had died and did not have venography; the other had popliteal and femoral DVT with evidence of pulmonary embolism on V/Q scans. We have started a prospective study of the incidence of pulmonary embolism in patients after surgery for proximal femoral fracture or hip or knee replacement; to date three of 36 consecutive patients (8.3%) have shown evidence of pulmonary embolism on V/Q scans.

Age is uncertain as a risk factor. Borow and Goldson (1981) found an increasing incidence of thrombosis with greater age, but Stulberg et al (1984) found no correlation. We found no differences in the mean age between patients with and without DVT.

Borow and Goldson (1981) also showed a linear relationship between DVT and the length of the operation, but again we found no relationship. It has been suggested that the incidence of thrombosis is lower after surgery under spinal anaesthesia as compared with general anaesthesia (Thorburn, Louden and Vallance 1980; Modig et al 1983; McKenzie et al 1985), but we found no significant difference. Our data must be interpreted with caution, however, because of an inadequate sample size and type-II statistical error. We did find a statistically significant correlation between the type of operation and the incidence of DVT, with the highest incidence after total knee replacement, and the lowest after operation for proximal femoral fracture.

Our study also confirms the lack of reliability of physical signs in the diagnosis of postoperative DVT as shown by Stulberg et al (1984).

Conclusion. The incidence of postoperative DVT in Asian patients is not as low as is commonly believed. Larger studies are needed to settle this controversy, but the present practice of withholding routine prophylaxis in such patients undergoing high-risk orthopaedic procedures should be reconsidered.

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