Quality Improvement Report

Reducing bruising after venepuncture

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Abstract

Bruising after venepuncture is undesirable. To verify an apparent increase in bruising after introducing a new venepuncture system in a small district general hospital and to improve the venepuncture service two prospective audits of the incidence and severity of bruising after venepuncture were performed in two groups of 100 consecutive inpatients undergoing venepuncture by phlebotomists. In the first audit bruising was detected in 45 patients, of whom 34(76%) had bruises > 100 mm² in area. After modification of the technique, whereby the phlebotomists ensured that haemostasis had been attained before leaving the patient, bruising was significantly reduced, occurring in 25 patients only 9 of whom (36%) had bruises > 100mm² in area (both $p < 0.01$) in the second audit. Monitoring of standards and simple modification of technique resulted in significant reduction in incidence and severity of bruising, improving the quality of the venepuncture service.

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Introduction

Venepuncture is the "shop window" of our pathology service, and as such it is important that patient distress and inconvenience are minimised. Painful venepuncture and unsightly bruising can leave a lasting impression of a substandard service.

After the introduction of a pre-evacuated tube collection system ("Vacutainer," Becton and Dickinson, Oxford) to our laboratory in January 1990 members of staff were concerned about an apparent increase in frequency and size of bruising in patients after venepuncture. It was impossible to test the validity of this assumption by comparison with the "needle and syringe" method previously used, as that method had not been evaluated. In addition, we were unaware of any pre-existing data that establishes standards against which our sampling could be measured.

We therefore examined the incidence and size of bruise after venepuncture by trained phlebotomists and repeated the study with the same staff with a comparable group of patients six months after the technique was modified to ensure haemostasis after venepuncture.

Table 1 Area of bruising corresponding to perpendicular dimensions

Perpendicular dimensions (mm)	Area (mm ²)
< 5 × 5 - 5 × 5	1 - 25
> 5 × 5 - 10 × 10	26 - 100
> 10 × 10 - 20 × 20	101 - 400
> 20 × 20 - 30 × 30	401 - 900
> 30 × 30	> 901

Patients and methods

We studied 100 consecutive medical and surgical inpatients who had blood samples collected by trained phlebotomists. Children (aged below 15 years), patients receiving anticoagulants, and patients with extensive pre-existing bruises were excluded from the study.

All blood samples were collected from the antecubital fossa, and the side from which the samples were taken was marked on the request form by the phlebotomist. Twenty four hours later the patients were visited and the venepuncture site examined by one of us (AC). If a bruise was present its longest dimensions in perpendicular planes were measured and recorded, with details of any pain or discomfort experienced by the patient during or after venepuncture. The area of the bruise was estimated as shown in table 1.

FEEDBACK AND TRAINING

After the first audit the results were fed back and additional advice and training (based on Royal College of Pathologists' recommendations for phlebotomists¹) was given to all the phlebotomists by ACC.

At the time of the initial audit the phlebotomists routinely taped a clean cotton wool ball to the venepuncture site and instructed the patient to apply pressure for a few minutes; haemostasis was therefore not always ensured before they left the patient. The recommendations after the first audit were that phlebotomists should stay by the patient until haemostasis had been achieved by their applying pressure with a cotton wool ball and examining the site at intervals until bleeding had stopped. The patient was then advised, when appropriate, to continue to maintain pressure with a clean cotton wool ball.

FOLLOW UP STUDY

The audit was repeated on a further 100 consecutive patients six months after feedback

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Table 2 Bruising after venepuncture related to decade of birth. Figures are number of patients with bruising/ number of patients in each category

Birth dates	First audit	Second audit
After 1970	2/6	0/3
1960 – 69	3/7	2/8
1950 – 59	1/7	2/11
1940 – 49	1/7	1/6
1930 – 39	4/10	2/14
1920 – 29	7/17	5/18
1910 – 19	14/26	9/26
1900 – 09	12/19	4/13
Before 1900	1/1	0/1
Total	45/100	25/100

Table 3 Effect of age on bruising after venepuncture. Figures are numbers (percentages) of patients

Age (years)	First audit	Second audit
< 60	11/37(30)	7/42(17)
> 60	34/63(54)	18/58(31)
Total	45/100(45)	25/100(25)

Table 4 Size of bruises after venepuncture. Figures are numbers of patients

Size of bruise (mm ²)	First audit	Second audit
None	55	75
1 – 25	2	10
26 – 100	9	6
101 – 400	13	6
401 – 900	9	1
> 901	12	2
Total	100	100

and the introduction of the modified technique. The incidence and severity of bruising in the two audits were compared to assess whether any changes had occurred.

The results were analysed with C Stat (Cherwell, Oxford) on a microcomputer.

Results

Thirty eight men and 62 women were studied in the first audit and 37 men and 63 women in the second. There was no significant difference in the ages of the patients in the two audits: the median age of patients in the first audit was 63 (range 16–94) and in the second was 66 (range 17–94). Two patients in the study were receiving steroids, one in the first series, who experienced bruising and one in the second, who did not. Four patients described slight pain and discomfort after venepuncture in the first audit; none did so in the second.

The incidence of bruising was significantly reduced in the second series of patients (25% *v* 45%, $p < 0.01$). In the first audit 17/38 (45%) men and 28/62(45%) women suffered bruising after venepuncture and in the second 7/37(19%) men and 18/63(29%) women.

Table 2 shows the number of patients in each 10 year age group with bruising after venepuncture; bruising was more common in older patients in both series (table 3). Table 4 shows the ranges of sizes of the bruises in both audits. In the first audit, before additional training 34/45(76%) of bruises were > 100 mm² in area whereas in the second audit this had fallen to 9/25(36%) (with Yates's correction 9.0, $p < 0.01$).

Discussion

Studies of venepuncture have concentrated on how technique affects the results obtained from the sample in relation to calcium concentration,² cholesterol concentration³ blood cultures,⁴ cell counts,⁵ and several other indices. These are, of course, essential aspects of good venepuncture technique.

It is also important to ensure minimum discomfort to the patient and that he or she is not left with an unsightly bruise which may take a long time to resolve completely. Even if bruising is short lived it may affect the patient's perception of the service he or she receives. The incidence and the extent of bruising can be used as a measure of the quality of this aspect of care. It is a visible and measurable index.

We audited the incidence of bruising before and after simple modification of venepuncture technique and effectively showed improvement in the quality of our service. The modification was more effective in reducing bruising in older patients, who may be less able than younger patients to apply pressure to a venepuncture site.

This audit enabled us to set a standard for venepuncture technique for this department which can be measured objectively. Through periodical assessment we aim at ensuring that this standard is maintained. In addition, we are introducing a self reporting card system to allow assessment of bruising after venepuncture in outpatients visiting our department.

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