EARLY BLEEDING INTO UPPER LIMB MUSCLES IN SEVERE HAEMOPHILIA

CLINICAL FEATURES AND TREATMENT

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The clinical features, management and outcome of bleeding into the muscles of the upper limb of 44 patients are reported. Of 158 episodes of bleeding, 99% were treated within two hours of onset of symptoms and the mean time to complete restoration of function was 2.1 days. The most frequent site of bleeding was the deltoid muscle (24%), followed by the forearm flexors (23.5%), brachioradialis (19.5%), biceps (14%), forearm extensors (11%) and triceps (8%).

The majority of bleeds presented with pain, either on movement or at rest, or with tenderness. Bleeds into the biceps required the most transfusions (mean 2.00) and took the longest to resolve (mean 4 days). Bleeding into the flexors and extensors of the forearm resolved most rapidly. The policy of early treatment has been shown to be effective in prompting early and complete recovery.

Home treatment by self administration of Factor VIII has led to the earlier treatment of bleeding into joints and muscles (Ingram, Brozovic and Slater 1982). The presenting features and response to early treatment of bleeding into the muscles of the lower limb have previously been reported (Aronstam et al. 1983). Similar details are presented for the upper limbs.

The Lord Mayor Treloar College is a boarding school with about 40 severely affected haemophilic boys in residence during the school term. Facilities are available for the intensive monitoring and early treatment of bleeding in these patients, which provides a unique opportunity to document the clinical features, management and outcome of haemorrhage.

The clinical features of 158 bleeds into the muscles of the upper arm of 44 boys presenting over a two-year period have been studied and are reported here.

MATERIALS AND METHODS

Since 1978 all bleeds occurring in severe haemophiliacs at the Lord Mayor Treloar College have been fully documented at presentation and reviewed by medical staff at 12-hourly intervals until full recovery. The diagnosis of a bleeding episode was based on the

presence of pain, tenderness, "stiffness", swelling and impairment of function in various combinations. The anatomical location of the bleed was noted. The shoulder, elbow, wrist and fingers were examined and the range of movement was recorded in each case.

When pain was the presenting feature we distinguished between pain on movement and pain at rest. The presence of tenderness was elicited by gentle palpation. Swelling was confirmed retrospectively by noting the later decrease in girth of the limb at a fixed marked site. Any injury within the previous 24 hours was also noted. A delay between the onset of symptoms and presentation, as well as the time of day when the symptoms began, were recorded. The number of transfusions given within the first 48 hours from the onset of bleeding was also recorded as well as the timing of these transfusions and the period required (to the nearest day) for complete restoration of function.

All bleeding episodes were treated on presentation with a transfusion of Factor VIII calculated to raise the level to 30% of the normal. The limb was rested either in a broad arm sling alone or a plaster of Paris backslab supported in a sling. As the acute symptoms settled, gradual gentle mobilisation was commenced under the supervision of a physiotherapist.

RESULTS

A study was made of 158 bleeds into the muscles of the upper limb. The distribution between the various muscle groups was noted: deltoid 24%, forearm flexors 23.5%, brachioradialis 19.5%, biceps 14%, forearm extensors 11% and triceps 8%.

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Table I. Antecedent trauma, symptoms and tenderness at presentation as a percentage for each muscle

	Number of bleeds	Trauma	Pain on movement	Pain at rest	Stiffness	Tenderness
Deltoid	38	16	45	42	18	82
Forearm flexors	37	16	62	19	13	83
Brachioradialis	31	16	55	26	19	90
Biceps	22	9	64	18	14	91
Forearm extensors	17	18	29	47	24	100
Triceps	13	38	54	38	8	92
All groups	158	19	51.5	32	16	89

Table II. Time of onset of bleeds, showing percentages for each muscle

	Number	On waking		Before noon		Noon to 6 p.m.		6 p.m. to midnight	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Deltoid	38	4	10.5	17	45	4	10.5	13	34
Forearm flexors	37	10	27	11	30	5	13	11	30
Brachioradialis	31	9	29	12	39	6	19	4	13
Biceps	22	5	23	12	54	5	23	0	0
Forearm extensors	17	4	23	9	53	2	12	2	12
Triceps	13	2	15	4	31	3	23	4	31
All groups	158	34	21.5	65	41	25	16	34	21.5

In 131 bleeds (83%) pain either on movement or at rest was recorded as the first intimation of haemorrhage. The remaining presentations were described as "stiffness". The distribution of pain on movement or pain at rest as an initial symptom is shown in Table I. Of those bleeds heralded by pain on movement, 65% of deltoid bleeds, 53% of brachioradialis bleeds, 42% of forearm extensor bleeds, 40% of triceps bleeds, 31% of biceps bleeds and 14% of forearm flexor bleeds had progressed to pain at rest by the time the patients were examined.

The presence or absence of tenderness, history of trauma, pain on movement, pain at rest, swelling and time of presentation were not associated with significant differences in time taken to complete restoration of function.

The number of episodes preceded by a history of trauma during the previous 24 hours and the presence of tenderness are also shown in Table I and the time of day symptoms were first noticed is shown in Table II. The time from the onset of the bleed until treatment was instituted was one hour or less in 66% and between one and two hours in 34%.

Different sites of haemorrhage

Deltoid. Thirty-two episodes (84%) were associated with restriction of movement of the shoulder. All had some restriction of abduction and in 57% this was the

sole restriction. In the remainder there were varying combinations of restriction involving rotation, flexion, extension and adduction of the shoulder.

A second transfusion was given within 48 hours on six occasions. The mean time to recovery after a single transfusion was 1.8 days compared with a mean recovery of 2.8 days after a repeat transfusion.

There was also no significant difference in time to restoration of function between bleeds treated within one hour of the onset of symptoms and those treated within one to two hours.

Forearm flexors. Of 21 episodes over one half were associated with restriction of movement of elbow, wrist or fingers either alone or in combination. All bleeds were treated within two hours of onset of symptoms and only six (16%) required more than one transfusion.

Brachioradialis. There was limitation of movement of either elbow or wrist in 15 episodes and of both joints in six.

Biceps. Twenty (91%) of the bleeds into the biceps were associated with restriction of movements, at the elbow in 18 and also at the shoulder in two. Twelve bleeds required only a single transfusion and the mean time to full recovery was 1.7 days. Ten bleeds required a repeat transfusion within 48 hours from the onset of symptoms and the mean time to recovery was 7.4 days (Table III).

Forearm extensors. Twelve of these bleeds (71%) were

associated with restriction of movement, four at wrist and elbow, and four at each of these joints alone.

Triceps. Eleven (85%) had some restriction of movement.

DISCUSSION

Pain, whether on movement or at rest, was the presenting symptom in 80% of bleeding episodes; tenderness was present in 90%. This contrasts with bleeds into the muscles of the lower limb where pain was present in 97% of all bleeds (Aronstam et al. 1983).

Bleeds in the upper limb were treated within two hours of onset of symptoms in 99% compared with 80% of bleeds into the lower limb (Aronstam et al. 1983). Upper limb bleeds tend to present earlier than those in the lower limb, and because they are treated more rapidly they are less likely to progress enough to cause pain at rest. This earlier presentation may be due to the comparatively small size of the muscle compartments in the upper limb.

Table III shows the mean time to restoration of function and the mean number of transfusions for bleeds into the various muscle groups. Bleeds into the biceps took significantly longer to recover than bleeds into the deltoid ($p < 0.05$), forearm flexors ($p < 0.005$) and brachioradialis ($p < 0.025$); the other muscle groups had numbers too small to permit valid statistical comparison. Bleeds into the biceps also required more transfusions of Factor VIII than the other groups, indicating that biceps bleeds are more serious and demand early and adequate treatment. Indeed, we have now altered our own practice and routinely re-transfuse patients with such bleeds at 12 hours.

Table III. Transfusions per bleed and time to recovery

	Bleeds	Transfusions per bleed (days)	Time to full recovery (days)
Deltoid	38	1.5 ± 0.5	1.9 ± 1.0
Forearm flexors	37	1.2 ± 0.3	0.9 ± 0.5
Brachioradialis	31	1.2 ± 0.4	1.7 ± 1.1
Biceps	22	2.0 ± 0.7	4.0 ± 3.7
Forearm flexors	17	1.4 ± 0.6	1.0 ± 0.4
Triceps	13	1.4 ± 0.4	1.7 ± 1.2
All groups	158	1.4 ± 0.5	1.9 ± 1.3

Bleeds into the other muscle groups presented less of a problem. No group showed a significant difference in recovery time between those treated within one hour or between one and two hours from the onset of symptoms. We found no correlation between the degree of restriction of movement of the relevant joints and the time taken for full recovery.

These results demonstrate the complete resolution of all upper limb bleeds, apart from those into biceps, within a mean time of less than two days, emphasising the value of early treatment of such episodes.

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