Arthrogryposis Multiplex Congenita

Background

Arthrogryposis multiplex congenita (AMC) describes the presence of multiple joint contractures at birth. Over 150 causes of AMC have been reported in the literature and the term AMC has been used to cover a diverse range of conditions in which multiple joint contractures is one feature. Despite improvements in the understanding of AMC, further clarification of its causes and a more precise method of classification is needed. There is also potential for further research into the subset of AMC cases caused by congenital neuromuscular disorders.

Objectives

- To estimate the incidence of AMC in Australia
- To describe the group(s) of clinicians who care for children with AMC
- To describe the pattern of malformations associated with AMC and the possible influence of prenatal and genetic factors

Case definition

Any child born on or after 1 January 1996 with two or more non-progressive joint contractures present since birth.

A joint contracture is fixed high resistance to passive straightening of the joint. Children with unilateral or bilateral talipes but with no other joint involvement should not be reported.

Results and discussion

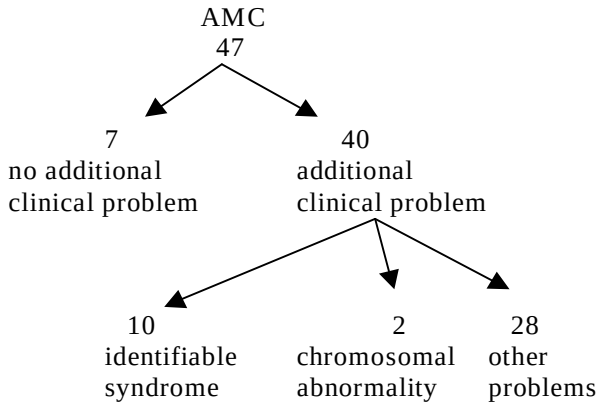
Between January 1996 and December 1998 inclusive, 101 notifications of AMC were received. There were 47 confirmed cases, giving an incidence of 6.2/100,000 live births. Twenty four notifications were duplicate reports, 25 were notification errors (most born before surveillance commenced in January 1996) and questionnaires were not returned for five notifications.

A total of 71 notifications were received for the 47 confirmed cases: 27 were received from general paediatricians, 21 from neonatologists, 4 from paediatric neurologists, eleven from clinical geneticists, two from rehabilitation specialists, four from a developmental/ rehabilitation paediatrician, one from a community paediatrician and one from a neurogeneticist.

Of the 47 confirmed cases, 23 were male and 24 were female. Forty-three of these cases had bilateral involvement of two or more major joint sites (elbow, wrist, hand, hip, knee, or ankle), signifying severe disease. Nine cases had contractures of the fingers in addition to major joint involvement.

Seven (15%) confirmed cases had no clinical problem other than joint contractures. The remaining 40 (85%) confirmed cases were associated with a variety of birth defects and other conditions. Two cases were associated with chromosomal abnormalities, ten had an identifiable syndrome and 28 had a variety of other problems (Figure 10).

Figure 10 Confirmed cases of AMC, 1996-1998



Chromosome results were available for 25 (53%) confirmed cases, and were abnormal in two. One child had trisomy 18 and another had an unbalanced reciprocal translocation between chromosomes 6 and 9. The identifiable syndromes associated with AMC are listed in Table 10.

Table 10 Identifiable syndromes associated with AMC, 1996-1998

Syndrome	
congenital axonal neuropathy	1
neuronal migration disorder	1
spinal muscular atrophy type 1 (Werdnig Hoffman disease)	2
oligohydramnios sequence	1
Larsens syndrome	1
Freeman-Sheldon syndrome	1
nemaline myopathy	1
infantile neuronal degeneration	1
new type distal arthrogryposis (Stickler spectrum)	1
	10

Of the 47 confirmed cases, twelve were reported as having a prenatal factor which may have contributed to the joint contractures (Table 11).

Table 11 Prenatal factors associated with AMC, 1996-1998

Prenatal factors associated with AMC, 1996-8	
oligohydramnios	5
breech presentation	1
polyhydramnios with prolonged rupture of membranes	1
intrauterine growth retardation	1
bicornuate uterus	1
maternal myasthenia gravis	1
small placenta	1
twin pregnancy	1
	12

Eleven cases had a contributory family history. In four cases, the parents were related to each other. Two cases had a sibling or siblings affected by AMC. One mother had myasthenia gravis, one had multiple epiphyseal dysplasia and one had significant intellectual disability of unknown aetiology. The father and paternal uncle of one case both required ankle splints in infancy, possibly manifesting a mild form of a genetic disorder. The father of the infant with the unbalanced reciprocal translocation had a balanced reciprocal translocation between chromosomes 6 and 9 {46,XY,t(6:9)(q25.1;p24)}.

Conclusion

AMC is a heterogeneous group of conditions with an incidence of 6.2 /100,000 among liveborn infants. This rate underestimates the overall incidence of AMC because cases resulting in termination of pregnancy or stillbirth are not included. This study will assist in the further development of classification of AMC.

In contrast to expectations, the majority (68%) of notifications were received from general paediatricians and neonatologists. Almost 90% of cases had an associated birth defect or other condition, while a prenatal condition which may have contributed to AMC was identified in 26% of cases.

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