

# The prognosis of childhood abdominal migraine

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## Abstract

**Aims**—To determine the clinical course of childhood abdominal migraine, seven to 10 years after the diagnosis.

**Methods**—A total of 54 children with abdominal migraine were studied; 35 were identified from a population survey carried out on Aberdeen schoolchildren between 1991 and 1993, and 19 from outpatient records of children in the same age group who had attended the Royal Aberdeen Children's Hospital. Controls were 54 children who did not have abdominal pain in childhood, matched for age and sex, obtained from either the population survey or the patient administration system. Main outcome measures were presence or resolution of abdominal migraine and past or present history of headache fulfilling the International Headache Society (IHS) criteria for the diagnosis of migraine.

**Results**—Abdominal migraine had resolved in 31 cases (61%). Seventy per cent of cases with abdominal migraine were either current (52%) or previous (18%) sufferers from headaches that fulfilled the IHS criteria for migraine, compared to 20% of the controls.

**Conclusions**—These results support the concept of abdominal migraine as a migraine prodrome, and suggest that our diagnostic criteria for the condition are robust.

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Keywords: abdominal migraine; prognosis; headache

Recurrent abdominal pain is a common problem in children,<sup>1</sup> and in many cases, despite extensive investigation, no organic disease is found. It has recently been shown that many such children come from families that display high levels of maternal neuroticism, and go on to suffer an increased prevalence of psychiatric disorders as adults.<sup>2</sup> However, although in the past it was widely believed that childhood abdominal pain with no obvious organic cause was commonly psychogenic,<sup>3-5</sup> this view did not pass unchallenged.<sup>6</sup> It is of course inherently unlikely that children with unexplained chronic or recurrent abdominal pain comprise a homogeneous group, and even in the absence of an organic diagnosis it is important to define the symptom complex as accurately as possible.<sup>7</sup> In this way, it might be possible to categorise subgroups of children with recurrent abdominal pain, which in turn might facilitate management.

One subgroup that is widely recognised by paediatricians is the periodic syndrome, a term

used to describe children who suffer from episodic symptoms including pallor, headache, abdominal pain, and vomiting, and who experience complete resolution of these symptoms between attacks. In their original report, Wyllie and Schlesinger<sup>8</sup> noted that symptoms continued to manifest themselves in adult life in the form of vomiting, with or without migraine. In Western Australia, Cullen and Macdonald<sup>9</sup> studied the prevalence of recurrent abdominal pain, in the context of the periodic syndrome, and documented the pattern of change from "bilious attacks" of early childhood to typical adult migraine. Barlow<sup>10</sup> also described the periodic syndrome as a significant feature in the longitudinal history of migraine.

Although abdominal migraine has been recognised for many years,<sup>11</sup> it is not included in the International Headache Society (IHS) classification,<sup>12</sup> although some believe it should be.<sup>13</sup> It has been suggested that the diagnosis of abdominal migraine can be regarded as proven only when detailed inquiry and follow up have revealed that the patient has suffered migraine with headache.<sup>14</sup> This view would imply that the diagnosis cannot be made at the time the child is suffering the pain, thus denying the child treatment that has been shown to be effective.<sup>15</sup>

There are several sets of criteria for the diagnosis of migraine headache, of which the most widely used is that proposed by the IHS,<sup>12</sup> which forms the basis of the widely used UCSD questionnaire.<sup>16</sup> In contrast, a constant problem in evaluating the literature on abdominal migraine is the lack of clear diagnostic criteria. Not every child with abdominal pain suffers from abdominal migraine; in fact very few do so.<sup>17</sup>

We have previously examined the case histories of children whose primary complaint was recurrent abdominal pain, and in whom a diagnosis of abdominal migraine was suggested by a positive family history of migraine and relief of symptoms with specific antimigraine therapy.<sup>18</sup> These children experienced prolonged bouts of severe, incapacitating pain, accompanied by a feeling of intense misery, together with a variety of symptoms similar to those experienced by migraineurs before or during headaches. Like children with migraine headaches, they were completely well between attacks. We then proposed the diagnostic criteria for abdominal migraine listed in table 1. In retrospect, we would have preferred to have phrased the description of the pain rather more graphically than simply stating that it was severe enough to interfere with normal activities, a phrase borrowed from diagnostic criteria for migraine headache.<sup>12</sup> In table 1 we have

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Table 1 Criteria for the diagnosis of abdominal migraine

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1. *Pain is severe enough to interfere with normal daily activities*  
This implies that the child is unable to continue with normal study or leisure activities, and is generally incapacitated. At school, he or she generally has to leave the classroom and lie down. During these attacks, most children describe their mood as one of intense misery.

2. *Pain is described as dull or sore in nature*  
The child has difficulty in finding adjectives that adequately describe the pain, and usually resorts to describing it as "just sore".

3. *Pain is periumbilical or poorly localised*  
The child generally points to the location of the pain with a vague circular motion of the hand, centred around the umbilicus.

4. *Pain is associated with any two of the following:*

- Anorexia
- Nausea
- Vomiting
- Pallor

These symptoms tend to be dramatic and severe, although many children find it difficult to distinguish anorexia from nausea. The pallor is often described in terms such as "all colour drains from his face". The pallor is often accompanied by dark shadows under the eyes. In a few patients, flushing is the predominant vasomotor phenomenon.

5. *Each attack lasts for at least one hour*  
In practice, most attacks last for at least four hours, and many last all day.

6. *There is complete resolution of symptoms between attacks*  
These children are not sickly or unwell, except during attacks, and do not appear to be suffering from anxiety, stress, or other psychological problems. Their parents describe them as normal and well adjusted.

7. *Attacks occur at least twice a year*  
This criterion is included to ensure that attacks are genuinely recurrent. There are certainly children with abdominal migraine whose attacks are less frequent, but they are unlikely to be referred to hospital clinics.

8. *The diagnosis is excluded if any of the following is present:*

- Mild symptoms not interfering significantly with daily activities
- Burning pain
- Non-midline abdominal pain
- Symptoms suggestive of food intolerance, malabsorption, or other gastrointestinal disease, e.g. diarrhoea or weight loss
- Attacks of less than one hour duration
- Persistence of symptoms between attacks

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expanded on the criteria published previously, to indicate more precisely what we mean by each item.

A link between recurrent abdominal pain and migraine is suggested from four separate strands of clinical evidence. Firstly, recurrent abdominal pain and migraine headaches commonly coexist during childhood,<sup>18-22</sup> though not in adults,<sup>23</sup> and recurrent abdominal pain may precede the development of migraine headaches.<sup>24</sup> Secondly, children with abdominal migraine have similar demographic and social characteristics to those with migraine headaches, similar trigger and relieving factors, and similar associated gastrointestinal, sensory, and vasomotor symptoms.<sup>17, 18</sup> Thirdly, antimigraine prophylactic therapy is efficacious in the treatment of children with a diagnosis of abdominal migraine.<sup>15, 18, 25</sup> Finally, children with a diagnosis of periodic syndrome have abnormalities of visual evoked responses similar to those found in children with migraine.<sup>26</sup>

However, in previous studies the criteria for the diagnosis of abdominal migraine and/or periodic syndrome have not been explicit, and the present study was designed to investigate the robustness of our criteria by testing the hypothesis that childhood abdominal migraine, as defined in table 1, was a precursor of migraine headaches in later life, as defined by IHS criteria.

## Methods

### ETHICAL APPROVAL

Ethical approval was obtained from the Local Research Ethics Committee of Grampian Health Board and the University of Aberdeen.

### PATIENTS

Cases were recruited from two sources:

- (1) A previous population based study of Aberdeen schoolchildren,<sup>17</sup> which identified 58 children with abdominal mi-

graine. These children fulfilled the criteria listed in table 1, and were also subjected to clinical examination (which was negative in every case), but were not further investigated.

- (2) Children in the same age range who had attended the Royal Aberdeen Children's Hospital contemporaneously with the study, and in whom abdominal migraine had been diagnosed by either IAA or GR. These children fulfilled the same diagnostic criteria, and were examined clinically. In addition, urine analysis was performed on all. There was no other predetermined diagnostic work up, but abdominal ultrasound was performed in four, with negative results. None of these patients presented subsequently with an alternative diagnosis; at a distance of 100 km from the nearest alternative children's unit, it is unlikely that many patients would have by-passed our hospital.

### CONTROLS

Controls for the cases identified in the population based study were recruited from asymptomatic children identified in the same study,<sup>17</sup> and were matched individually for age, sex, and school attended. Controls for the clinic patients were identified by using the hospital computer database, on which every child born in the area is registered, to find children who were of the same sex and born in the same week as the cases. Three potential controls were found for each case and were contacted in turn until one responded. Table 1 lists the criteria<sup>17, 18</sup> used for the diagnosis of abdominal migraine. We used the questions asked in our previous population study, designed to elicit the presence or absence of each of these features. To diagnose migraine headaches, we used a previously vali-

Table 2 Prognosis of childhood abdominal migraine

	Total (n = 54)		Boys (n = 27)		Girls (n = 27)	
	Cases n (%; 95% CI)	Control n (%; 95% CI)	Cases n (%)	Control n (%)	Cases n (%)	Control n (%)
No current abdominal pain	33 (61; 46.9, 74.1)	49 (90.7; 79.7, 96.9)	18	24	15	25
No migraine headache at any time	12 (22; 12.0, 35.6)	42 (77.8; 64.4, 88)	7 (26)	23 (85)	5 (19)	19 (70)
Current migraine headaches	11 (20.4; 10.6, 33.5)	7 (13.0; 5.4, 24.9)	4 (15)	1 (4)	7 (26)	6 (22)
Previous migraine headaches, now resolved	10 (18.5; 9.30, 31.4)	0 (0; 0, 6.6)	7 (26)	0 (0)	3 (11)	0 (0)
Current abdominal pain	21 (39; 25.9, 53.1)	5 (9.26; 3.1, 20.3)	9	3	12	2
No migraine headache at any time	4 (7.4; 20.1, 17.9)	1 (1.9; 0, 0.98)	2 (7)	1 (4)	2 (7)	0 (0)
Current migraine headache	17 (31.5; 19.5, 45.6)	4 (7.4; 2.1, 17.9)	7 (26)	2 (7)	10 (37)	2 (7)
Total with migraine headaches, past or present	38 (70.4; 56.4–82.0)	11 (20.4; 10.6–33.5)	18 (67)	3 (11)	20 (74)	8 (30)

dated questionnaire<sup>16</sup> based on the IHS criteria for migraine.

An initial letter was sent to the home address of cases and controls, detailing the aims of the study and explaining that they would subsequently be contacted by telephone. A telephone interview was then conducted using the two questionnaires described above. The child and one parent, usually the mother, were consulted to ensure accuracy of information. Occasionally, questions regarding other health problems were raised. These were side stepped with advice to see the individual's own practitioner, on the basis that the questioner was a medical student and was not qualified to answer such questions.

Confidence intervals (CI) were calculated using a computer package<sup>27</sup>; all results are expressed as 95% CI. Differences between groups were examined using the  $\chi^2$  test.

### Results

Of 90 children who had previously fulfilled our diagnostic criteria for abdominal migraine, we were able to identify correct current addresses for 54 (35 from the schools study and 19 from the clinic patients). All but one agreed to take part in the project. Both sexes were equally represented. The mean age of both cases and controls was 17 years (median 16 years; range 12–25 years). There were no apparent age or sex differences between responders and those who could not be traced.

Table 2 presents the results. It can be seen that although abdominal migraine tended to disappear with the passage of time, 21 of the cases (38.9%) with previous abdominal migraine were still suffering recurrent abdominal pain. Just over 70% of the cases were either current or previous sufferers from migraine headaches, compared to only 20% of the controls ( $\chi^2 = 24.08$ ;  $p < 0.001$ ).

### Discussion

This investigation is the first to follow up children in whom the criteria used for the diagnosis of abdominal migraine have been explicit. These criteria do not apply to the great majority of children with recurrent abdominal pain. In our population study,<sup>17</sup> fewer than 6% of children with abdominal pain were considered to have abdominal migraine.

The patients were followed up through telephone interviews. This approach was adopted because: (a) many clinic patients lived at some distance (up to 350 km) from the hospital, and would be unlikely to attend for clinical

interview; (b) commitments at school, college, and work would make attendance problematical for patients in this age group; and (c) our previous experience with the use of clinical examination in epidemiological studies of migraine indicated that this labour intensive procedure added nothing to the diagnostic accuracy of a well structured interview.<sup>28</sup> In diagnosing migraine headache, we used a validated questionnaire,<sup>16</sup> which was easily completed by telephone. For abdominal migraine, we used the questions in our previous population study, designed to elicit the presence or absence of each of the diagnostic criteria listed in table 1. The telephone interview format also allowed responses to be checked for accuracy by questioning a second informant, usually the mother.

Our follow up was incomplete because of failure to find current addresses for 40% of the cases we wished to interview. There is no reason to believe that this failure was anything other than random, and data protection regulations within the EU precluded further attempts to trace these individuals. With a 98% response rate from those individuals we were able to trace, we believe that our cases represent a statistically valid sample. Our controls were carefully matched for age and sex, and were asymptomatic at the time of our initial survey,<sup>15</sup> or in the case of controls identified from the patient administration system, seven years prior to interview.

Recurrent abdominal pain in childhood is generally considered to have a benign prognosis,<sup>29–30</sup> the majority of cases resolving spontaneously over one or two years.<sup>31</sup> The 40% prevalence of continuing abdominal pain in our cases probably reflects the relatively brief follow up period.

Wyllie and Schlesinger<sup>8</sup> observed that the periodic disorders of childhood tended to manifest as migraine headache in adult life, and Cullen and MacDonald<sup>9</sup> found that "bilious attacks" of early childhood typically went on to adult migraine. More recently it has been suggested that recurrent abdominal pain should be viewed as a prodrome of migraine headache<sup>24</sup>; the high prevalence of migraine in our children after a relatively brief follow up would support this view. In adolescence and early adult life, 70% of our cases with childhood abdominal migraine had either current or previous migraine headaches, compared to only 20% of controls. These figures are higher than those reported by Bille<sup>19</sup>; differences in methodology and a possible increase in the prevalence of

migraine over the past 30 years may account for this variation. The proportion of migraineurs in the control group is higher than we found in the childhood population,<sup>28</sup> and reflects the trend for the prevalence of migraine to increase with age. It is also of interest that, of the 11 controls who developed migraine headaches, four (36%) also suffered from recurrent abdominal pain, a much higher proportion than that observed by Blau and Macgregor<sup>23</sup> in a group of 100 adult migraineurs, and probably a reflection of the relatively young age of our patients at follow up.

These results, together with our previous report of the successful prevention of abdominal migraine with pizotifen,<sup>15</sup> suggest that our diagnostic criteria for abdominal migraine are robust. They will therefore be useful in making a positive diagnosis of this condition, which in turn will avoid unnecessary investigation, ensure appropriate management, and, through proper explanation and reassurance, reduce stress and anxiety in affected children and their families.

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