

Group A Streptococcus Spinal Epidural Abscess During Varicella

Caroline Quach, MD, FRCPC*‡; Bruce Tapiero, MD, FRCPC*; and Francisco Noya, MD, FAAP‡

ABSTRACT. Multiple complications of varicella have been described. Musculoskeletal complications (osteomyelitis, septic arthritis, and necrotizing fasciitis) as well as neurologic complications (ataxia, encephalitis, and transverse myelitis) are well-known. We describe the cases of 2 children, ages 18 months and 5 years, who were admitted recently to 2 pediatric hospitals in Montreal with a resolving varicella, abdominal and lumbar pain, and a refusal to walk and in whom a diagnosis of epidural abscess caused by group A streptococcus (GAS) was established. No previous case of epidural abscess caused by GAS in the context of varicella has been reported. Epidural abscesses are rare in pediatrics and are caused mainly by hematogenous spread of *Staphylococcus aureus*. The diagnosis in pediatrics is challenging because it is rare and does not present as classically as in adults. The prognosis is related to the presence of neurologic deficits before surgery and to the rapidity with which the diagnosis and the intervention are made. These cases highlight a new clinical association in children of epidural abscess caused by GAS and varicella. An early clinical diagnosis requires a high index of suspicion when back or abdominal pain with or without neurologic signs and symptoms occurs during or soon after varicella. *Pediatrics* 2002;109(1). URL: <http://www.pediatrics.org/cgi/content/full/109/1/e14>; *varicella, spinal epidural abscess, group A streptococcus*.

ABBREVIATIONS. GAS, group A streptococcus; SEA, spinal epidural abscess; WBC, white blood cells; CSF, cerebrospinal fluid; MRI, magnetic resonance imaging; OR, operating room.

Varicella is a common childhood viral illness, with a projection of 380 000 cases annually in Canada, approaching the annual birth rate.¹ The estimated risk of hospitalization is approximately 1 in 550 cases.² Multiple complications from varicella have been described. The majority of these consist of secondary skin and soft tissue bacterial infections ranging from 45% to 73% of the reported complications caused mainly by group A β -hemolytic streptococcus (GAS) and *Staphylococcus aureus*.^{2,3} Neurologic complications (18%–21%), such as encephalitis, postinfectious cerebellar ataxia, Reye syndrome, aseptic meningitis, and transverse myeli-

tis, have also been reported.^{2,4,5} Musculoskeletal complications mostly attributable to GAS (osteomyelitis, necrotizing fasciitis, myositis, and septic arthritis) are well-described,⁶ but no previous case of spinal epidural abscess (SEA) has been found in the literature. We describe 2 cases of children with a diagnosis of SEA as a complication of varicella.

CASE 1

A previously healthy 1½-year-old boy presented with fever up to 40°C for 4 days and refusal to sit or walk for 3 days. He had developed varicella 6 days before the onset of fever and had a mild case until then. His mother had received a diagnosis of streptococcal pharyngitis the week before admission. On examination, he was irritable. There was no evidence of secondary bacterial superinfection of the skin and soft tissues. He had a stiff neck and bilateral brisk patellar deep tendon reflexes, clonus, and positive Babinski sign. The muscular strength was normal. His peripheral white blood cell (WBC) count was $14.8 \times 10^9/\text{mm}^3$. A lumbar puncture yielded clear cerebrospinal fluid (CSF) containing 50 WBC/ mm^3 , 4.3 mmol/L glucose, and 13.4 g/L proteins. Gram stain and culture of the CSF were negative. Intravenous therapy with cefotaxime and vancomycin was started. A throat culture done by his pediatrician 3 days before admission grew GAS. Magnetic resonance imaging (MRI) of the spine showed a posterior extradural collection pushing the spinal cord forward from T3-T4 to T10-T11 and peripheral contrast enhancement after gadolinium injection (Fig 1). The patient was taken to the operating room (OR) 36 hours after admission, where a T5-T11 laminotomy was performed and revealed 3 epidural abscesses with purulent material posterior to the cord. The pus and the blood culture taken on admission grew GAS (M3/T3). Once the culture results were obtained, the treatment was changed to aqueous penicillin G intravenously on which he remained for a total course of 6 weeks. A brace was installed for 3 months, and he improved gradually. At the end of the intravenous antibiotic course, no sequelae remained and a repeat MRI showed complete healing.

CASE 2

A previously well 5½-year-old boy presented to a pediatric hospital with complaint of left paravertebral lumbar pain and left-sided abdominal pain for the previous 2 days. A history of fever up to 40°C for the preceding 4 days as well as a resolving varicella (day 7 of evolution on admission) was of notice. New lesions appeared until the fifth day of varicella, but no sign of secondary bacterial skin superinfection was present. During his varicella course, he was in contact with a cousin who had streptococcal pharyngitis. On examination, he was not toxic but was irritable with a slightly stiff neck and was refusing to sit, stand, or lie on his back because of pain. On palpation, he localized the pain to the lumbar left paravertebral region. Deep tendon reflexes and strength were normal. A lumbar puncture revealed 112/ mm^3 WBC, 3.6 mmol/L glucose, 0.42 g/L protein. Gram stain and culture of the CSF were negative. Cefazolin was given intravenously on admission and changed to ceftriaxone after the lumbar puncture was obtained. His peripheral WBC was $23.2 \times 10^9/\text{mm}^3$, and his throat culture was also positive for GAS. An MRI done 36 hours after admission revealed a circumferential epidural collection around the cord extending from T8 to T10 and obliterating the CSF space that enhanced after gadolinium injection. The patient was taken to the OR that same day, where a T9-T11 laminotomy was performed. Pus was drained, the fibrin was cleaned off the

From the *Division of Infectious Disease, Department of Pediatrics, Sainte-Justine Hospital, University of Montreal, Quebec, Canada; and ‡Division of Infectious Disease, Department of Pediatrics, Montreal Children's Hospital, McGill University, Montreal, Quebec, Canada.

Received for publication Jun 5, 2001; accepted Aug 21, 2001.

Reprint requests to (B.T.) Sainte-Justine Hospital, 3175, Côte Sainte-Catherine, Montreal, Quebec, Canada, H3T 1C5. E-mail: bruce_tapiero@ssss.gouv.qc.ca or tapiero@cedep.net

PEDIATRICS (ISSN 0031 4005). Copyright © 2002 by the American Academy of Pediatrics.



Fig 1. T1-weighted image showing multiple epidural abscesses caused by GAS from T3-T4 to T10-T11.

dural surface, and irrigation with an antibiotic solution was done. The patient improved gradually and defervesced after the surgery. The OR specimen as well as the blood culture grew GAS (M12/T12). The treatment was then changed to intravenous aqueous penicillin G, but for convenience, the patient was sent home on ceftriaxone to complete a 4-week course of intravenous antibiotics. The patient remains free of sequelae, and a repeat MRI after the completion of the intravenous antibiotics showed complete healing.

DISCUSSION

SEAs in the adult population occur mainly in patients with underlying conditions—diabetes, intravenous drug use, immunodeficiency, previous spinal surgery—and are increasing in frequency.⁷ The incidence of SEA varies from 0.2 to 1.2 per 10 000 admissions in all age groups.⁸ A recent review of the literature in children revealed that SEA is rare in the pediatric age group and that the predominant pathogen found was *S aureus* with methicillin-resistant organisms becoming an increasingly important causative agent.⁷ A review done by Rubin et al⁹ on SEA

in the pediatric age group also found that the main causative agent was *S aureus* (79%) followed by *Streptococcus viridans* and *Streptococcus pneumoniae* (4% each), and *Salmonella enteritidis* (2%). In our review of the literature, we only found 1 other case of SEA caused by GAS; it was reported by Nussbaum et al¹⁰ in a previously healthy 7-year-old girl with no previous history of varicella.

One case of SEA in the context of varicella was reported previously in a 2-year-old girl who developed varicella while admitted.¹¹ Her skin lesions became secondarily infected with *S aureus*, with associated septicemia and pneumonitis. Skin abscesses were incised and drained and grew *S aureus*. SEA was diagnosed after the incision and drainage were performed. We are not aware of any cases of SEA in varicella caused by GAS.

Aebi et al³ reviewed bacterial complications of primary varicella in children. Of the 84 patients with a bacterial complication, 36 (43%) had a GAS infection. Eighteen patients of 84 had invasive infections. Only 2 patients had acute pharyngitis. Nonetheless, 17 of 36 patients with GAS infection had a throat culture done, 7 of which were positive for GAS.

GAS is a known cause of serious infections that occur during the course of varicella. Law et al¹² reviewed chickenpox admissions to 11 pediatric Canadian hospitals from 1991 to 1996 and found that 49% of the serious bacterial infections were caused by GAS, but no cases of SEA were found.

SEAs are mainly secondary to hematogenous seeding of the epidural space in pediatrics with the primary focus being mainly skin and soft tissue infection but could also be upper respiratory tract infections, urinary tract infection, and osteomyelitis.^{9,11,13,14} The primary focus for our cases was probably the pharyngitis (throat culture positive in 2 of 2 patients) because there was no evidence of skin superinfection.

The classical symptomatology of SEA was described by Heusner.¹⁵ First, back pain and fever appear and progress to spinal ache and root pain and can mimic acute abdomen.¹⁶ The reflexes can be altered before motor weakness is seen. Increasing weakness of the muscles and bowel as well as bladder incontinence will be followed by total paralysis. The differential diagnosis includes myelitis caused by bacterial meningitis, syphilis, viral meningitis, and a parainfectious process, as well as the syndrome of acute transverse myelopathy of unknown cause. Rarely, a lymphoma may mimic a SEA. Spinal cord tumors, vascular malformations, and arachnoiditis are to be thought of when evidence of sepsis is minimal or absent.¹⁷

Rubin et al⁹ looked at the CSF abnormalities in children with SEA and found that 22 of 42 cases (52%) had a purulent CSF, 26% had signs of suspected meningeal infection (mild leukocytosis or low glucose levels), and 12% had increased proteins as the only CSF abnormality. Ten percent had normal lumbar punctures. Danner and Hartman¹⁸ found that a CSF protein content of >3.5 g/L was associated with a complete block of the spinal canal. Rockney et al¹⁹ also found that 9 of 17 (53%) of the

patients with SEA had elevated CSF protein values and 41% had a mildly elevated WBC count. These descriptions fit with our patients' lumbar puncture profiles.

Treatment lies in prompt surgery, and the outcome has been reported to be directly related to the preoperative neurologic impairment.^{10,14,18,20} Some studies in adults showed that certain categories of patients could be treated only with intravenous antibiotics, but no data are available in children.^{10,20-23}

CONCLUSION

SEA in children is rare. These cases highlight a new clinical association in children who have SEA caused by GAS and varicella. Prompt clinical diagnosis and treatment are mandatory. It requires a high index of suspicion because of variable nonspecific presentation but should be looked for when a child with varicella presents with abdominal or back pain with or without neurologic findings, regardless of the lumbar puncture results.

Furthermore, these cases emphasize the importance of a vaccination program against varicella. With the increasing use of varicella vaccine in Canada since its recent licensure, the incidence of such bacterial complications of varicella is expected to decrease.

REFERENCES

1. Bentsi-Enchill A. VZV disease and epidemiology. *Can Commun Dis Rep.* 1998;24:193-198
2. Peterson CL, Mascola L, Chao SM, et al. Children hospitalized for varicella: a prevaccine review. *J Pediatr.* 1996;129:529-536
3. Aebi C, Ahmed A, Ramilo O. Bacterial complications of primary varicella in children. *Clin Infect Dis.* 1996;23:698-705
4. Schreck P, Schreck P, Bradley J, Chambers H. Musculoskeletal complications of varicella. *J Bone Joint Surg.* 1996;78-A:1713-1719
5. Gershon AA. Varicella-zoster virus. In: Feigin RD, Cherry JD, eds. *Textbook of Pediatric Infectious Diseases.* 4th ed. Philadelphia, PA: WB Saunders; 1998:1769-1777
6. Mills WJ, Mosca VS, Nizer V. Orthopaedic manifestations of invasive group A Streptococcal infections complicating primary varicella. *J Pediatr Orthop.* 1996;16:522-528
7. Auletta JJ, John CJ. Spinal epidural abscesses in children: a 15-year experience and review of the literature. *Clin Infect Dis.* 2001;32:9-16
8. Baker AS, Ojemann RG, Swartz MN, Richardson EP. Spinal epidural abscess. *N Engl J Med.* 1975;293:463-468
9. Rubin G, Michowiz SD, Ashkenasi A, Tadmor R, Rappaport H. Spinal epidural abscess in the pediatric age group: case report and review of the literature. *Pediatr Infect Dis J.* 1993;12:1007-1011
10. Nussbaum ES, Rigamonti D, Standiford H, Numaguchi Y, Wolf AL, Robinson WL. Spinal epidural abscess: a report of 40 cases and review. *Surg Neurol.* 1992;38:225-231
11. Grevitt MP, Mehdian SH. Epidural abscess in an infant. *Eur Spine J.* 1998;7:413-415
12. Law BJ, MacDonald N, Halperin S, et al. The Immunization Monitoring Program Active (IMPACT) prospective five year study of Canadian children hospitalized for chickenpox or an associated complication. *Pediatr Infect Dis J.* 2000;19:1053-1059
13. Schweich PJ, Hurt TL. Spinal epidural abscess in children: two illustrative cases. *Pediatr Emerg Care.* 1992;8:84-87
14. Anand S, Maini L, Agarwal A, Singh T, Dhal AK, Dhaon BK. Spinal epidural abscess: a report of six cases. *Int Orthop.* 1999;23:175-177
15. Heusner AP. Nontuberculosis spinal epidural infections. *N Engl J Med.* 1948;239:845-854
16. Jacobsen FS, Sullivan B. Spinal epidural abscesses in children. *Orthopedics.* 1994;17:1131-1138
17. Pomeroy SL, Sutton ME, Dodge PR. Parameningeal infections. In: Feigin RD, Cherry JD, eds. *Textbook of Pediatric Infectious Diseases.* 4th ed. Philadelphia, PA: WB Saunders; 1998:430-438
18. Danner RL, Hartman BJ. Update of spinal epidural abscess: 35 cases and review of the literature. *Rev Infect Dis.* 1987;9:265-274
19. Rockney R, Ryan R, Knuckey N. Spinal epidural abscess: an infectious emergency. *Clin Pediatr.* 1989;28:332-334
20. Rigamonti D, Liem L, Sampath P, et al. Spinal epidural abscess: contemporary trends in etiology, evaluation and management. *Surg Neurol.* 1999;52:189-197
21. Khanna RH, Malik GM, Rock JP, Rosenblum ML. Spinal epidural abscess: evaluation of factors influencing outcome. *Neurosurgery.* 1996;39:958-963
22. Wheeler D, Keiser P, Rigamonti D, Keay S. Medical management of spinal epidural abscesses: case report and review. *Clin Infect Dis.* 1992;15:22-27
23. Manfredi PL, Herskovitz S, Folli F, Pigazzi A, Swerdlow ML. Spinal epidural abscess: treatment options. *Eur Neurol.* 1998;40:58-60

Group A Streptococcus Spinal Epidural Abscess During Varicella

Caroline Quach, Bruce Tapiero and Francisco Noya

Pediatrics 2002;109:e14

DOI: 10.1542/peds.109.1.e14

Updated Information & Services	including high resolution figures, can be found at: http://pediatrics.aappublications.org/content/109/1/e14
References	This article cites 21 articles, 0 of which you can access for free at: http://pediatrics.aappublications.org/content/109/1/e14#BIBL
Subspecialty Collections	This article, along with others on similar topics, appears in the following collection(s): Infectious Disease http://www.aappublications.org/cgi/collection/infectious_diseases_sub Rheumatology/Musculoskeletal Disorders http://www.aappublications.org/cgi/collection/rheumatology:musculoskeletal_disorders_sub
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: http://www.aappublications.org/site/misc/Permissions.xhtml
Reprints	Information about ordering reprints can be found online: http://www.aappublications.org/site/misc/reprints.xhtml

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Group A Streptococcus Spinal Epidural Abscess During Varicella

Caroline Quach, Bruce Tapiero and Francisco Noya

Pediatrics 2002;109:e14

DOI: 10.1542/peds.109.1.e14

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://pediatrics.aappublications.org/content/109/1/e14>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2002 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 1073-0397.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

