PRACTICAL SUMMARIES IN

ACUTE CARE

A Focused Topical Review of the Literature for the Acute Care Practitioner

Erythema Multiforme, Stevens-Johnson Syndrome, and Toxic Epidermal Necrolysis

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Introduction

Erythema Multiforme (EM), Stevens-Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN) are a spectrum of a single disease that share common causes and mechanisms but are differentiated based on the severity of the reaction. They are relatively rare in occurrence, but are associated with significant mortality rates.

EM was first described in 1860 by von Hebra as an acute, self-limiting skin disease primarily consisting of target lesions on the extremities. In 1922, Stevens and Johnson described a potentially life-threatening mucocutaneous skin disorder that started with a viral prodrome and progressed to a rash involving mucosal surfaces. Finally, in 1956, Lyell described TEN, which is characterized by significant skin sloughing and associated mortality. In recent years, there has been a consensus to classify these as a spectrum of the same disease, with EM being a minor variant, SJS involving less than 10% body surface area (BSA) detachment, SJS-TEN overlap involving 10-30% BSA, and TEN involving greater than 30%.

This disease occurs as a result of an acute hypersensitivity reaction to a variety of stimuli. The causes can be broken down into drug exposure, infection, malignancy, and idiopathic etiologies. EM most often is associated with an infectious cause, of which *Mycoplasma* and herpes simplex virus are two of the most common. Alternatively, SJS and TEN more often are associated with adverse reactions to drugs.

EM affects males more often than females, with an incidence of 2:1. However, in SJS and TEN, the incidence is equal. The peak ages are 20-40 years, and the incidence is exceedingly rare in patients younger than age 3 and older than age 50. Genetic predisposition is a possibility.

The incidence of this disease is only 1-7 cases per million per year; however, the mortality is quite high and ranges from 5% for SJS to 40% for TEN.

In SJS and TEN, the initial diagnosis primarily is clinical in nature. The classic rash occurs symmetrically initially on the palms, soles, dorsum of the hands, and extensor surfaces. It begins as macules and develops into papules, vesicles, or bullae. The center of the lesions is vesicular, purpuric, or necrotic, creating the classic target lesions. Eventually, these targets rupture. The classic physical exam finding is Nikolsky's sign, which is detachment of the epidermis with slight lateral pressure. The rash also may affect mucosal surfaces, including oral, nasal, ocular, vaginal, urethral, gastrointestinal, and lower respiratory tract.

Healing takes approximately 2 weeks, and treatment is primarily supportive in nature. It includes a multidisciplinary approach, with possible admission to a burn unit in severe cases, removal of the causative agent,

Volume 3 • Number 11 • November 2008 • Pages 81-88

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Statement of Financial Disclosure: Executive Editor, Ann M. Dietrich, MD, FAAP, FACEP; Dr. Knepel (author); and Dr. Coates (peer reviewer) reported no financial relationships with companies having ties to this field of study.

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supportive care, and alleviation of pain. Currently, no generally accepted treatment protocol exists. The use of steroids, IVIG (intravenous immunoglobulin), and other immunosuppressives remains controversial.

The following discussion will review recent literature of the causes, diagnosis, and treatment of the spectrum of diseases spanning erythema multiforme to toxic epidermal necrolysis, focusing on the ongoing controversy of treatment with steroids and IVIG.

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$299 per year. Add $17.95 for shipping & handling
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Multiple Copies
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Outside the United States
$329 per year plus GST (Student/Resident rate: $159.50 plus GST).

Practical Summaries in Acute Care, ISSN 1930-1103, is published monthly by AHC Media LLC, 3525 Piedmont Rd., NE, Bldg. 6, Suite 400, Atlanta, GA 30305.
ASSOCIATE PUBLISHER: Coles McKagen
SENIOR MANAGING EDITOR: Suzanne Thatcher
MARKETING MANAGER: Schandale Kornegay
GST Registration Number: R128870672.
Periodicals Postage Paid at Atlanta, GA 30304 and at additional mailing offices.

POSTMASTER: Send address changes to ***Practical Summaries in Acute Care***, P.O. Box 740059, Atlanta, GA 30374.

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What New Drugs Are Associated with SJS/TEN?

Source: Mockenhaupt M, Viboud C, Dunant A, et al. Stevens-Johnson syndrome and toxic epidermal necrolysis: assessment of medication risks with emphasis on recently marketed drugs. The EuroSCAR-study. *J Invest Dermatol* 2008;128:35-44.

In 1995, the SCAR-study (Severe Cutaneous Adverse Reaction) was designed to assess the risk of SJS and TEN related to medication usage. Anti-infective sulfonamides, allopurionol, carbamezepine, phenobarbital, phenytoin, aminopenicillins, cephalosporins, quinolones, cycline antibiotics, and oxicam-NSAIDs were found to have a high relative risk for SCARs. Since the original study was completed, many new drugs have been marketed. The EuroSCAR-study was designed for ongoing surveillance of medication risks for SJS and TEN.

The EuroSCAR-study is a multinational case-control study conducted in Europe between 1997 and 2001. Cases were actively detected in a network of 1800 hospitals covering 100 million inhabitants. Three hundred seventy-nine cases and 1505 controls were admitted. Cases were defined as patients admitted to the hospital with a diagnosis of SJS or TEN. For every case, three controls were enrolled. Controls were patients admitted with acute conditions and matched on age, gender, region, and date of interview.

New drugs found to have a high relative risk for SJS/TEN were nevirapine and lamotrigine. Sertraline, pantoprazole, and tramadol had a weaker association. No other SSRI (selective serotonin reuptake inhibitor) or PPI (proton pump inhibitor) had a significant relative risk. Strong associations were confirmed for anti-infective sulfonamides, allopurinol, carbamezepine, phenobarbital, phenytoin, and oxicam-NSAIDs. A strong association was not confirmed with valproic acid, and the authors proposed that earlier associations may have been confounded by co-medications. Statins and sulfonamide-related diuretic and antidiabetic agents also did not show a significant relative risk.

Of note, among cases exposed to drugs with significant associations, 85-100% had initiated treatment within 8 weeks of the reaction, and no significant risk was found after 8 weeks of use.

Commentary

Literature on SJS and TEN is rife with case reports on drugs suspected as causes, but weak on literature that shows statistical significance. This study strives to evaluate medication risks for inducing SJS and TEN with a case-control study in a multi-center trial and was able to achieve significant results.

The greatest strength of EuroSCAR is that it achieved an enrollment of more than 300 cases, which is significant for a disease with such a low incidence. Its primary weakness lies in the fact that it is a case-control study with some inherent limitations. By definition, controls should represent the study base from which cases are drawn and be similar in all relevant aspects. Although they did try to control for multiple variables, the rate of infection and malignancy (known risk factors for SJS/TEN) were not controlled in this study.

The major findings were new associated risk with nevirapine and lamotrigine, as well as the suspected

association with tramadol, pantoprazole, and sertraline. The study also validated findings of previous drugs with known strong associations with SJS and TEN. EuroSCAR should caution practitioners when choosing drugs for patients with a personal or family history of SJS and also will help in the detection of the trigger of SJS/TEN in the patient with an exposure to multiple pharmaceuticals.

Should PCR Be Used to Detect *M. pneumoniae* in Severe Mucositis?

Source: Ravin KA, Rappaport LD, Zuckerbraun NS, et al. Mycoplasma pneumonia and atypical Stevens-Johnson syndrome: a case series. *Pediatrics* 2007;119:e1002-e1005.

TYPICALLY, SJS IS DIAGNOSED clinically based on the classic skin manifestations found on physical exam. Mucositis, without this classic rash, has a wide differential that includes infectious agents, autoimmune etiologies, and drug reactions.

Mycoplasma pneumoniae, a common cause of community-acquired respiratory illnesses, is the most common infectious cause of SJS in children. This article presents a series of three cases of severe mucositis associated with respiratory illness, without the classic rash that is typical of SJS, in which the diagnosis of *M. pneumoniae* was facilitated by the use of polymerase chain reaction (PCR)-based assay. Throat-swab specimens from each patient tested positive for both *M. pneumoniae* in duplicate reactions, and there was no evidence of PCR inhibition. All three patients improved with appropriate treatment for *M. pneumoniae.*

The authors recommend PCR testing for *M. pneumoniae* in the pediatric population in patients presenting with severe mucositis and respiratory symptoms to facilitate diagnosis and treatment and to decrease the duration of illness.

Commentary

Infection is the primary trigger for EM/SJS in children. There are obvious limitations to the clinical impact of disease management based on a case-based series of three; however, one of the hallmarks for the management of SJS is identifying and removing the causative agent. In cases in which the presentation of a disease, which is diagnosed based on a classic rash, is not classic, obtaining objective data may facilitate management. PCR testing is reasonable to facilitate diagnosis in patients with concomitant severe mucositis and respiratory illness.

Are Steroids, IVIG Better Than Supportive Treatment Alone for SJS/TEN?

Source: Schneck J, Fagot JP, Sekula P, et al. Effects of treatments on the mortality of Stevens-Johnson syndrome and toxic epidermal necrolysis: a retrospective study on patients included in the prospective EuroSCAR Study. *J Am Acad Dermatol* 2008;58:33-40.

THE STANDARD OF CARE FOR SJS/TEN has yet to be definitively established. A large prospective, multi-center trial called EuroSCAR took place between April 1997 and December 2001 that was designed to evaluate the risk of medication exposure for SJS/TEN. It was not designed to analyze the effects of treatment. These authors took data collected in this initial trial and designed a second study to compare treatment of SJS/TEN with steroids, IVIG, both, or neither.

This study is a retrospective case-controlled analysis of a sub-group of patients involved in the original study. The original EuroSCAR trial involved 7 countries and 1800 hospitals. Due to logistics, the patient population in this study was limited to the patients enrolled in the study in France and Germany, which was 80% of the total enrollment. This resulted in 281 patients in the study. The authors obtained copies of the patients' charts and collected data on demographics, significance of disease, and treatments. Any treatment with steroids (IV or oral), IVIG, or immunosuppressants was noted as a specific treatment. The outcome measure was death. Combined treatment with both IVIG and corticosteroids was not noted as a separate treatment category, but each treatment was noted individually.

The results of the retrospective analysis showed no benefit to treatment with either IVIG or corticosteroids over supportive care alone. Limitations of the study included variations in patient population (France vs. Germany), standards of supportive care, and treatment doses and durations.

The results showed a trend toward benefit in the patient population treated with corticosteroids, but it was not statistically significant.

Commentary

Historically, due to the rarity of the disease, studies have had difficulty reaching enrollments that provided statistically significant results. The strength of this study is its size. This study has the largest population of patients ever analyzed with regard to treatment of SJS/TEN.

However, this study has some major weaknesses that impact the significance of the results. First, EuroSCAR is an add-on study to an original prospective study that was designed to look at drugs as a risk factor for the development of SJS/TEN; in no way was it designed to evaluate

the impact of treatment on disease. This study also was a retrospective analysis of patients enrolled in 2 of the 7 countries. Even between the 2 countries (France and Germany), there were significant differences in the standards of treatment, including supportive care and drug therapy. A majority of the patients in Germany received corticosteroid treatment, while in France a patient was more likely to receive supportive care only. Furthermore, in the patients who received drug therapy, there was no way to control for factors such as initiation of treatment, drug, dose, route, and length of therapy.

While this study was interesting in its size and the authors had good intentions of evaluating the benefit of current treatments of SJS/TEN, it fell far short of providing good evidence-based conclusions for a standard treatment protocol.

Should the SCORTEN Score Be Revised?

Source: Vaishampayan SS, Das AL, Verma R, et al. SCORTEN: does it need modification? *Indian J Dermatol Venereol Leprol* 2008;74:35-37.

SCORTEN IS A VALIDATED SEVERITY of illness score established by Basutjii-Gatin et al in 2000 to predict mortality of TEN based on 7 factors at the time of hospital admission. These factors are as follows:

- Age older than 40 years;
- Malignancy;
- Heart rate > 120/minute;
- Initial epidermal detachment >10% of BSA;
- Serum urea level >28 mgm/dL;
- Serum glucose levels >250 mgm/dL; and
- Serum bicarbonate levels <20 mEq/dL.

One point is given for each of the 7 variables within the first 24 hours. Mortality predictions are as follows:

- 0 to 1 Point, 0.03;
- 2 Points, 0.12;
- 3 Points, 0.35;
- 4 Points, 0.58; and
- 5 Points or greater, 0.90.

The SCORTEN score has been validated in previous studies. This study was a prospective observational study at a tertiary care center. The purpose was to validate the SCORTEN score in the Asian Indian population. This study enrolled 10 patients with TEN who were ages 3-70 with BSA involvement of 10-95%. SCORTEN scores were obtained on days 1 and 5.

The authors proposed that the percentage of BSA be given graded points, that other severe chronic diseases be included within the score, and that the SCORTEN analysis be done on the fifth day as well as the first day to more accurately predict prognosis.

Commentary

SCORTEN has been validated in the literature multiple times since its proposal in 2000. However, this study proposes several interesting modifications. TEN has a clinical picture similar to extensive partial-thickness burns. As in this study, TEN-related deaths and burn deaths are commonly due to septicemia. It has been well established in the burn literature that the greater percentage of BSA involved and the greater the co-morbidities, the higher the mortality. It follows that this would be the case in TEN as well. Additionally, in TEN the disease tends to evolve over several days, with BSA involvement increasing for several days from initial presentation. The evolution of the disease is not accounted for in the original SCORTEN score; again, the proposal of a repeat SCORTEN score seems reasonable. The weakness in this study is the power. Due to the low enrollment, no significant statistical analysis could be done. At this time, it seems that although the authors' suggestions are reasonable, a larger study is needed before the current SCORTEN score is altered.

Should a New Lesion Classification Be Added to the Recognized Spectrum for SJS/TEN?

Source: Wolf R, Wolf D, Davidovici BB, et al. In the pursuit of classifying severe cutaneous adverse reactions. *Clin Dermatol* 2007;25:348-349.

IN 1992, A GROUP OF CONTEMPORARY experts in the field of dermatology established a consensus classification for the lesions of EM, SJS, and TEN according to their clinical appearance and linked this to etiology and prognosis. Currently, the clinical patterns of EM-like lesions are described by 1 of 4 configurations, including:

1. Typical targets;
2. Raised atypical targets;
3. Flat atypical targets; or
4. Macules with or without blisters.

Patients in the EM group present with typical targets and/or raised atypical targets, often from a reaction to an infectious disease. The SJS/TEN group shows flat atypical targets and macules with or without blisters and often is associated with an adverse drug reaction.

The authors note that they also have observed typical targets that are flat and missing the palpable ring around the center. The flat typical targets lesions are short-lived and usually turn into flat atypical targets. These lesions are associated with the SJS/TEN group. The authors propose that this fifth type of lesion, flat typical targets, be added to the current classification

and that the lesions typical targets be renamed raised typical targets.

Commentary

Although it may seem to be a relatively minor point, in a disease in which the diagnosis is established on a clinical basis, this new classification of the lesions of EM/SJS/TEN could impact the management and treatment of the disease.

Typical targets generally have a palpable ring around the center and are a hallmark of EM. Typical targets that are flat may be found early in the course of the disease and subsequently evolve into flat atypical targets that are associated with SJS and TEN. The clinical course, treatment, management, and disposition for EM versus SJS/TEN is significant; therefore, this further definition of the spectrum of lesions associated with these diseases may help the clinician early in the management of this disease.

IVIG for SJS and TEN: Is it Beneficial?

Source: French LE. Toxic epidermal necrolysis and Stevens Johnson syndrome: our current understanding. *Allergol Int* 2006;55:9-16.

CURRENTLY, THE MANAGEMENT OF SJS/TEN involves discontinuation of the causative agent and supportive care. Specific drug therapy remains controversial. One of the specific therapies used in the treatment of SJS/TEN is IVIG.

This study looks at 9 studies completed since 1997, when the potential benefit of the use of IVIG in the treatment of SJS/TEN was first proposed. All of the studies are noncontrolled. Enrollment ranges from 10 to 48 patients.

In analysis of the 9 studies, 7 indicate patient benefit with IVIG therapy at >2 gm/kg with lower than expected mortality. The 2 studies that did not show benefit used lower doses of IVIG. Due to the low number of patients enrolled in these studies, none of these results are statistically significant.

The author suggests that treatment with IVIG at >2 gm/kg may be beneficial in the treatment of SJS/TEN and calls for further study.

Commentary

This paper offers a good review of SJS/TEN. Additionally, it reviews 9 studies that evaluate the use of IVIG in SJS/TEN.

Although the overall trend seems to indicate a benefit to IVIG therapy, none of the studies had enrollment large enough to elicit statistically significant results. The author did not attempt a metaanalysis but instead summarized the studies.

Overall, this discussion supports the use of IVIG at a dose of >2 gm/kg in the treatment of SJS/TEN but still does not provide statistically significant evidence-based data.

Is IVIG Helpful in SJS and TEN Treatment?

Source: Stella M, Clemente A, Bollero D, et al. Toxic epidermal necrolysis (TEN) and Stevens-Johnson syndrome (SJS): experience with high-dose intravenous immunoglobulins and topical conservative approach. A retrospective analysis. *Burns* 2007;33:452-459.

THIS STUDY IS A RETROSPECTIVE analysis of all hospitalized patients at Turin Burn Center with a diagnosis of SJS/TEN from 1993 to 2005. Prior to 1999, IVIG was not used. This study compares the outcome of 23 patients treated with high-dose IVIG from 1999 to 2005 to a control group of 8 patients in which IVIG was not used between 1993 and 1998. Of note, conservative wound management in the IVIG group replaced extensive epidermal debridement and coverage with artificial skin substitute that was the standard in the pre-IVIG group. SCORTEN and standardized mortality ratio (SMR) were used to evaluate efficacy of the therapies.

Initial SCORTEN scores from both groups were three, which predicted a mortality of 35%. Mortality in the pre-IVIG group was 75% compared to the IVIG-treated group, which had a mortality of 26%. The SMR showed a trend toward lower actual mortality rate (not significant) with high-dose IVIG treatment vs. the predicted mortality. Additionally, days to wound healing were 17 for the pre-IVIG and 12 for the high-dose IVIG group, and the high-dose IVIG group had a lower percentage of BSA overall.

These authors concluded there was a trend toward lower mortality with IVIG; however, the sample size was too small to be significant, and they suggest further large randomized, placebo-controlled trials to assess the risks and benefits of treating TEN with IVIG.

Commentary

What is interesting with this study is that it compares old and new management techniques of SJS and TEN with a trend toward positive results in a single institution.

The authors showed a significant decrease in mortality from 75% to 26% over a 12-year period. Nutrition and fluid management did not vary significantly between the IVIG and the pre-IVIG groups. However, there were several other management differences between the two groups, including the use of steroids and antibiotics, consistent admission to a burn unit, and conservative care replacing extensive wound debridement. Each of these is a potential significant differ-

ence between the two groups that the authors were unable to control for.

Does Skin Substitute Use Improve TEN Outcomes?

Source: Boorboor P, Vogt PM, Bechara FG, et al. Toxic epidermal necrolysis: use of Biobrane for skin coverage reduces pain, improves mobilization, and decreases infection in elderly patients. *Burns* 2008;34:487-492.

SKIN AND MUCOSAL EXFOLIATION IN TEN are associated with dehydration, protein loss, and thermoregulation disturbances that lead to physiologic and immunological changes. Historically, TEN has a mortality rate of 40%. Death is primarily due to infection, sepsis, metabolic disturbances, or lung involvement. These authors hypothesized that using a synthetic skin substitute could decrease the associated morbidity and mortality of TEN.

Biobrane is a synthetic wound dressing composed of a silicone film with a partially embedded nylon fabric that has collagen chemically bound to the thread. Blood and sera clot in the nylon matrix and adhere the dressing to the wound until re-epithelialization occurs. Once applied, the dressing does not need to be changed. In the treatment of second-degree burns, synthetic skin substitutes have been shown to decrease wound secretions and pain, decrease time to rehabilitation and mobilization, and decrease overall length of hospitalization. Notable disadvantages include protracted wound infections, difficulty establishing wound depth after application, and high cost (which is ameliorated to some degree because the dressing does not require daily changes as standard treatment does).

This study compared the use of a synthetic skin substitute, Biobrane, to standard wound care. Fourteen elderly patients diagnosed with TEN and having >30% BSA involvement were enrolled over four years. SCORTEN scores, pain scores, time to mobilization, time to re-epithelialization, serum proteins, albumin, CRP (C-reactive protein), leukocytes, and body temperature were recorded. Evaluated outcome measures included infection, protein loss, re-epithelialization, and mortality. Mean age of patients enrolled was 68 years, mean BSA involvement was 66.4%, mean SCORTEN score was 3, and mortality was 36%. No patients received corticosteroids, IVIG, other immunosupressants, or prophylactic antibiotics.

Overall outcomes in the synthetic skin substitute group versus the control group included decreased pain scores, earlier mobilization (walking on day 3 vs. day 7), earlier re-epithelialization (day 12.5 vs. day 16), and decreased serum protein loss, CRP, and WBC count.

Commentary

At this time, supportive care is the mainstay of treatment for TEN. This study reviewed improving outcomes of TEN by applying a new therapy used currently in the treatment of thermal burns.

Interestingly, the authors did not comment in their methods section on their enrollment procedures. It is unclear whether patients were randomized for the treatment vs. control groups. It also is unclear whether this study was prospective or if the control group was a historical control group. Additionally, as with many studies of SJS/TEN, the number of patients in the study was too small to produce statistically significant outcomes.

Despite the limitations, the trends in outcome seem to support decreased pain and increased mobilization in the synthetic skin substitute group that would decrease patient suffering and increase patient satisfaction. Additionally, there was earlier re-epithelialization and decreased metabolic and electrolyte disturbances in the synthetic skin substitute group.

Finally, these were sick patients with an average age of 68 years and an average BSA involvement of 66%; it is surprising that mortality was not higher. Although no statistically significant decrease in mortality was noted between the two groups, it would be interesting to see if a statistically significant decrease in mortality would be noted in a larger prospective, randomized trial of this treatment.

Do Steroids Enhance Treatment of SJS and TEN?

Source: Kardaun SH, Jonkman MF. Dexamethasone pulse therapy for Stevens-Johnson syndrome/toxic epidermal necrolysis. *Acta Derm Venereol* 2007;87:144-148.

HISTORICALLY, THE USE OF HIGH-dose steroid therapy has been advocated in the treatment of SJS/TEN. Since the mid-1980s, this use of steroids has become controversial, with multiple studies showing mixed results.

The authors proposed to evaluate the efficacy of dexamethasone pulse therapy with regard to mortality and healing time in the treatment of SJS/TEN. Dexamethasone was chosen due to strong glucocorticoid suppression with negligible mineralacorticoid effect.

The study enrolled consecutive patients with a documented diagnosis of SJS or TEN over 10 years. Twelve patients were enrolled. The study was a non-controlled retrospective analysis that used the

SCORTEN score to evaluate the efficacy of treatment. The primary result was that there was one patient death versus four predicted with the SCORTEN score. Additionally, stabilization of skin sloughing occurred at 2.3 days and total re-epithelialization occurred at 13.9 days. There was no statistical significance of the results due to the low enrollment number. The authors concluded that a short-term course of steroids early in the course of SJS/TEN could decrease mortality without increasing healing time.

Commentary

The benefit of using steroids in the treatment of SJS/TEN still remains controversial. However, this study adds one more mark in the column supporting the use of steroids. The authors' chosen course of treatment was designed to minimize risk and maximize benefit. The results seem to indicate that they were successful. Most significantly, the actual rate of mortality was dramatically lower than the predicted rate based on the SCORTEN score.

Unfortunately, as with many studies related to SJS/TEN, the number of patients in the study was too small to provide statistically significant conclusions. Again, a larger prospective trial is needed to validate this proposed therapy.

Conclusion

SJS AND TEN ARE THE MOST severe SCAR (severe cutaneous adverse reaction) to medications. Although rare, they have a significant impact on public health due to the high mortality associated with them.

To date, there has been one large-scale trial for SJS/TEN, the EuroSCAR-Study, which prospectively looked at new drug risks for SJS/TEN. Both nevirapine and lamotrigine were found to be associated with SJS and TEN in this prospective study. These data also were used to elicit treatment data. It showed a trend of benefit with corticosteroid treatment and no benefit with treatment with IVIG. Unfortunately, there were significant flaws in this study and the conclusions did not reach statistical significance. The remainder of the studies reviewing the use of steroids and IVIG remain inconclusive. Currently, the literature is trending toward decreased mortality with high-dose pulse steroids and high-dose IVIG, but none of the studies completed enrolled populations large enough that the results reach statistical significance.

At this time, a large, prospective, controlled trial evaluating the use of steroids and IVIG in the treatment of SJS and TEN needs to occur to answer these lingering questions. Unfortunately, due to the rare incidence of this disease, it is questionable if such a study is feasible.

United States Postal Service
Statement of Ownership, Management, and Circulation

1. Publication Title	2. Publication No.	3. Filing Date
Practical Summaries in Acute Care	1 9 3 0 - 1 1 0 3	10/1/08
4. Issue Frequency	5. Number of Issues Published Annually	6. Annual Subscription Price
Monthly	12	$299.00

7. Complete Mailing Address of Known Office of Publication *(Not Printer) (Street, city, county, state, and ZIP+4)*
3525 Piedmont Road, Bldg. 6, Ste. 400, Atlanta, Fulton County, GA 30305
Contact Person: Robin Salet
Telephone: 404/262-5489

8. Complete Mailing Address of Headquarters or General Business Office of Publisher *(Not Printer)*
3525 Piedmont Road, Bldg. 6, Ste. 400, Atlanta, GA 30305

9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor *(Do Not Leave Blank)*
Publisher *(Name and Complete Mailing Address)*
Robert Mate, President and CEO
AHC Media LLC, 3525 Piedmont Road, Bldg. 6, Ste. 400, Atlanta, GA 30305
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☐ Has Not Changed During Preceding 12 Months
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PS Form **3526**, September 1998 *See instructions on Reverse)*

13. Publication Name: Practical Summaries in Acute Care
14. Issue Date for Circulation Data Below: September 2008

15. Extent and Nature of Circulation			Average No. of Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date
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i. Total *(Sum of 15g, and h.*			257	207
Percent Paid and/or Requested Circulation *(15c divided by 15g times 100)*			77%	84%

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17. Signature and Title of Editor, Publisher, Business Manager, or Owner: President and CEO — Date: 9/28/08

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including multiple damages and civil penalties).

Instructions to Publishers

1. Complete and file one copy of this form with your postmaster annually on or before October 1. Keep a copy of the completed form for your records.
2. In cases where the stockholder or security holder is a trustee, include in items 10 and 11 the name of the person or corporation for whom the trustee is acting. Also include the names and addresses of individuals who are stockholders who own or hold 1 percent or more of the total amount of bonds, mortgages, or other securities of the publishing corporation. In item 11, if none, check the box. Use blank sheets if more space is required.
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PS Form **3526**, September 1999 *(Reverse)*

Several studies have looked at alternative approaches to the standards of supportive care. These include studies considering synthetic skin substitute, which has reported benefits in the morbidity of SJS/TEN even though the studies have been small.

In summary, the only true standard of care in the treatment of SJS/TEN is supportive care, including a multidisciplinary team approach, and admission to a burn unit. Both steroids and IVIG may be considered in the treatment of SJS and TEN.

CME OBJECTIVES

Upon completing this program, participants will be able to:

- Summarize the most recent significant studies in emergency medicine/urgent care related to a single topic;
- Discuss up-to-date information about new drugs, techniques, equipment, trials, studies, books, teaching aids, and other information pertinent to the stated topic;
- Evaluate the credibility of published data and recommendations about the stated topic.

CME INSTRUCTIONS

Physicians participate in this continuing medical education program by reading the articles, using the provided references for further research, and studying the CME questions. Participants should select what they believe to be the correct answers, then refer to the list of correct answers to test their knowledge. To clarify confusion surrounding any questions answered incorrectly, please consult the source material.

After completing this activity, participants must complete the evaluation form provided at the end of each semester (May and November) and return it in the reply envelope provided to receive a credit letter. When an evaluation form is received, a credit letter will be mailed to the participant.

CME QUESTIONS

51. Which of the following drugs is associated with SJS/TEN?
a. Atorvastatin
b. Nevirapine
c. Glipizide
d. Azithromycin

52. The current SCORTEN scoring system, used to predict mortality in SJS/TEN, gives a point for which of the following variables?
a. Diabetes mellitus
b. Tuberculosis
c. Age
d. Smoking

53. Which of the following are considered standard of care in the treatment of SJS/TEN?
a. Corticosteroids
b. Immunosuppressives
c. IVIG
d. Supportive care

54. Skin and mucosal exfoliation are associated with which of the following?
a. Dehydration
b. Protein loss
c. Thermoregulation disturbances
d. All of the above

55. The use of a synthetic skin substitute in the treatment of TEN provides which of the following benefits?
a. Decreased mortality
b. Decreased ocular complications
c. Decreased time to re-epithelialization
d. Decreased SCORTEN score

Answers: 51. B; 52. C; 53. D; 54. D; 55. C