

pain that may last for days or weeks. Care is supportive, and hot-water therapy does not appear to benefit the victim.

## TREATMENT MARINE VERTEBRATE STINGS

The stings of all marine vertebrates are treated in a similar fashion. Except for stonefish and serious scorpionfish envenomations (see below), no antivenom is available. The affected part should be immersed immediately in nonscalding hot water (45°C/113°F) for 30–90 min or until there is significant relief from pain. Recurrent pain may respond to repeated hot-water treatment. Cryotherapy is contraindicated, and no data support the use of antihistamines or steroids. Opiates will help alleviate the pain, as will local wound infiltration or regional nerve block with 1% lidocaine, 0.5% bupivacaine, and sodium bicarbonate mixed in a 5:5:1 ratio. After soaking and anesthetic administration, the wound must be explored and debrided. Radiography (in particular, MRI) may be helpful in identification of foreign bodies. After exploration and debridement, the wound should be irrigated vigorously with warm sterile water, saline, or 1% povidone-iodine in solution. Bleeding usually can be controlled by sustained local pressure for 10–15 min. In general, wounds should be left open to heal by secondary intention or treated by delayed primary closure. Tetanus immunization should be updated. Antibiotic treatment should be considered for serious wounds and for envenomation in immunocompromised hosts. The initial antibiotics should cover *Staphylococcus* and *Streptococcus* species. If the victim is immunocompromised, if a wound is primarily repaired and is more than minor, or if an infection develops, antibiotic coverage should be broadened to include *Vibrio* species. Infection with *Aeromonas* species is of similar concern for wounds associated with natural freshwater.

## APPROACH TO THE PATIENT: Marine Envenomations

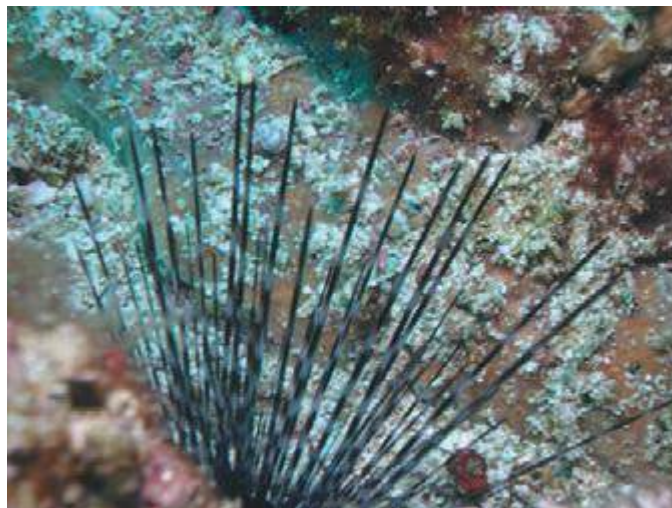
It is useful to be familiar with the local marine fauna and to recognize patterns of injury.

A large puncture wound or jagged laceration (particularly on the lower extremity) that is more painful than one would expect from the size and configuration of the wound is likely to be a stingray envenomation. Smaller punctures, as described above, represent the activity of a sea urchin (Fig. 474-6) or starfish. Stony corals cause rough abrasions and, in rare instances, lacerations or puncture wounds.

Coelenterate (marine invertebrate) stings sometimes create diagnostic skin patterns. A diffuse urticarial rash on exposed skin is often indicative of exposure to fragmented hydroids or larval anemones. A linear, whiplike print pattern appears where a jellyfish tentacle has contacted the skin. In the case of the dreaded box jellyfish, a cross-hatched appearance, followed by development of dark purple coloration within a few hours of the sting, heralds skin necrosis. A frosted appearance may be created by aluminum salt-based remedies applied to the wound. An encounter with fire coral causes immediate pain and swollen red skin irritation in the pattern of contact, similar to but more severe than the imprint left by exposure to an intact feather hydroid. Seabather's eruption, caused by thimble jellyfishes and larval anemones, may produce a diffuse rash that consists of clusters of erythematous macules or raised papules and is accompanied by intense itching (Fig. 474-7). Toxic sponges create a burning and painful red rash on exposed skin, which may blister and later desquamate. Because virtually all marine stingers invoke the sequelae of inflammation, local erythema, swelling, and adenopathy are fairly nonspecific.

## SOURCES OF ANTIVENOMS AND OTHER ASSISTANCE

The best way to locate a specific antivenom in the United States is to call a regional poison control center and ask for assistance.



**FIGURE 474-6** Spiny sea urchins. (Courtesy of Dr. Paul Auerbach, with permission.)

Divers Alert Network, a nonprofit organization designed to assist in the care of injured divers, also may help with the treatment of marine injuries. The network can be reached on the Internet at [www.diversalertnetwork.org](http://www.diversalertnetwork.org) or by telephone 24 h a day at (919) 684-9111. An antivenom for the box jellyfish (*C. fleckeri*) and another for stonefish



**FIGURE 474-7** Erythematous, papular rash typical of seabather's eruption caused by thimble jellyfish and larval anemones.