ZOSTER SINE HERPETE

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A review of the extensive literature on zoster reveals that infection with the zoster virus may produce more than a localized reaction due to involvement of the sensory arc in one or two segments. The pathological process may extend to the anterior horn and nerves and, more rarely, to viscera and autonomic nerves, to the meninges, and to the central nervous system in an extensive and even fatal manner.

In the course of a clinical study of 120 cases of zoster seen in a group of general practices a number of patients presented symptoms and signs highly suggestive of zoster but without a rash, a condition which has been recorded previously by a few observers and which was termed "zona fruste" by Widal (1907) and "zoster sine herpette" by Weber (1916).

Zoster sine herpette may present as a variety of syndromes. From the present study it would appear that these syndromes are far less rare than the very few instances recorded in the literature would lead one to suppose.

Types of Pain

Important in the recognition of some of the syndromes of zoster sine herpette is an appreciation of the character of the pain in zoster. This is of two types: a deep boring or twisting pain arising in muscles, joints, ligaments, etc., usually associated with tenderness of these structures to pressure, which has been termed "sclerotomal pain"; and a superficial, burning or prickling pain, usually with associated hyperaesthesia, arising in or near the skin and termed "dermatomal pain." Both types of pain occur in most patients, but either may be present without the other. When both varieties are present the sclerotomal pain usually precedes the dermatomal pain by a few days, occasionally by a week or two. It is the early onset of sclerotomal pain with its associated muscle tenderness that occasionally leads to erroneous diagnoses of renal or intra-abdominal disease in the pre-eruptive phase of zoster.

The pain of zoster usually subsides in from two to six weeks, but in a few individuals, particularly those of advanced years or unstable personality, the superficial pain may persist and develop into a post-herpetic neuralgia. Two types of pain—deep and superficial—also occur in zoster involving the seventh cranial nerve, but either type may occur without the other. Severe, deep, stabbing pain, believed by Hunt (1910) to be due to involvement of the middle ear, may occur. It is distinguished from the pain of bacterial infection of the middle ear by the normal appearance of the drumhead. It commonly precedes the superficial pain by a few days. The superficial pain precedes or accompanies herpetic involvement of the auricle or auditory canal, and may be felt deeply in the ear when the auditory canal or tympanic membrane is involved. It is more constant than the middle-ear pain, and burning in character, but subject to waves of exacerbation, particularly when the involved area is touched, as by an auriscope. Radiation of this pain in the direction of the throat or tonsil is common, and when the pain is very severe it may radiate to the trigeminal, occipital, and cervical areas.

In the whole field of infectious disease subclinical and incomplete forms are known to occur, and in some they are common. The Schick-negative adult who has neither been immunized against diphtheria nor suffered a clinical attack of diphtheria is commonplace, and most adults are tuberculin-positive without having suffered from overt tuberculosis. Scarlet fever now quite commonly presents as a mild sore throat without tongue signs or rash, the diagnosis being made in retrospect two or three weeks later, when peeling of the hands and feet is noted. In the realm of virus infections the subclinical form is known to be the rule in poliomyelitis, and during epidemics of chicken-pox and rubella it is not uncommon to see a susceptible close contact develop a mild pyrexial illness within the incubation period of that disease with none, or only some, of its classical symptoms and signs. Thus, rubella is sometimes seen as a mild diffuse or localized lymphadenitis without rash, and often without pyrexia or malaise; and chicken-pox as a mild fever without rash, or with only an odd vesicle or two on the scalp or within the oral cavity. Most of these cases would be undiagnosable but for their appearance in the midst of an epidemic. In the same way there is little doubt that zoster may present in a variety of ways without the characteristic rash, but the diagnosis is made difficult because epidemics of zoster, in the accepted sense, do not occur.

Zoster is characterized by segmental pain and segmental rash, sometimes with the addition of associated signs such as eye lesions, visceral involvement, or muscle paresis. It is believed that cases of zoster may occur in which only one of these features is present, and when the rash is absent diagnosis becomes difficult. In the presence of characteristic symptoms without a rash the finding of a C.S.F. lymphocytosis, with or without a slight increase in protein, adds a little weight to the diagnosis. However, these changes are not specific to zoster, and in many cases of typical zoster the C.S.F. is normal.

Pain in a Different Segment Without Rash

It is not uncommon to see examples of zoster in which the diagnosis is not in doubt, since segmental pain and typical rash are present, but in which the same type of pain occurs in another segment but without rash, in the course of the same illness. Thus Morey (1946), in recording his own experience of an attack of herpes oticus, describes severe painful hyperaesthesia in the whole of the cutaneous distribution of the Gasserian ganglion of the same side, but without a rash in this area. This he attributed to involvement of the Gasserian ganglion without eruption. Watson (1941) described a case of zoster involving the seventh, eighth, ninth, and tenth cranial nerves, with severe pain in the face in the distribution of the maxillary nerve but without a rash in this area. He regarded this as indicating minor involvement, sufficient to produce pain but not sufficient to produce vesiculation. Porteous (1947) described a case in which severe knife-like pains in the right shoulder and arm were associated with a typical vesicular eruption in the distribution of the tenth thoracic nerve on the left side. The following are examples of many cases seen which illustrate this phenomenon.

Case 1.—A woman aged 50 developed a typical attack of zoster with pain, hyperaesthesia, and typical cutaneous lesions on the right side of the chest wall in an area corresponding to the cutaneous distribution of the fifth thoracic nerve. On the seventh day, as the lesions were drying, she developed precisely the same type of pain and hyperaesthesia in the cutaneous distribution of the fifth thoracic nerve on the left side. No herpetic lesions developed on the left side, and the pain lasted only one week.

Case 2.—A man aged 28 developed soreness and hyperaesthesia over the right neck and shoulder and a severe boring pain in the left side of the neck. On the second day typical cutaneous lesions of zoster appeared over the right shoulder in an area corresponding to the cutaneous distribution of the third and fourth cervical nerves, but his main complaint still was of severe pain felt deeply in the left side of the neck. This pain was aggravated by movement of the neck or shoulder. By the fourth day the deep pain had subsided and in its place there was soreness and hyperaesthesia of the overlying skin, precisely similar to that which he had experienced on the opposite side. This disappeared within 10 days without the appearance of a cutaneous eruption.

Sclerodermal or Dermatomal Type of Pain

From consideration of cases such as these it is not difficult to visualize the occurrence of cases of zoster sine herpete characterized by segmental pain of sclerotomal or dermatomal type, or both, with or without associated general symptoms, and running a course of one to several weeks without the development of cutaneous lesions. This type of case was described by Widal (1907) and designated by him *zona fruste*. His patient was a man aged 38 who suddenly developed sharp pains on the left side of the chest with mild fever, anorexia, and headache, but without physical signs in the painful area or in the lung. This severe pain was localized to an area between the fifth and the eighth or ninth intercostal spaces, and was now aggravated by touch or pressure. Dilatation of the left pupil was also noted. His Wassermann reaction was negative. Lumbar puncture revealed a moderate lymphocytic pleocytosis. This patient was closely observed until symptom-free, but he did not develop any cutaneous lesions. The following cases show the same type of clinical picture and course.

Case 3.—A man aged 44 complained of the sudden onset of severe aching pain in the left thigh, aggravated by walking and associated with mild general malaise. By the third day the pain was less severe and he was able to walk without limping, but he had developed soreness and tenderness of the lateral aspect of the left thigh extending up to the buttock, in an area corresponding to the cutaneous distribution of the second and third lumbar nerves. Examination revealed marked hyperaesthesia in this area and tenderness to compression of all parts of the left thigh. Radiography of the left hip-joint, pelvis, and dorso-lumbar spine showed no abnormality. By the fourteenth day there was very little residual pain or hyperaesthesia, but slight aching in the thigh after cycling or walking persisted for three months.

Case 4.—A woman aged 54 developed a deep ache extending in a band round the left chest wall in an area corresponding to the cutaneous distribution of the fifth thoracic nerve. It was not aggravated by movement, respiration, or the pressure of clothing. It remained relatively mild for two weeks, then became more severe and accompanied by superficial soreness. Examination at this stage revealed marked hyperaesthesia in the painful area but no abnormality of the lungs or spine. The pain remained severe for a further week, then abated rapidly. She was symptom-free one month from the onset.

Case 5.—A woman aged 47 gave a history of five days' deep boring pain in the left flank, "like a twisted muscle," and of two days' soreness extending round the left side of the abdomen. The deep pain was aggravated by any movement of the trunk, and the superficial pain by the contact of clothing. There was anorexia and general malaise. Examination revealed a band of hyperaesthesia extending from the left lumbar region round the left side of the abdomen, in an area corresponding to the cutaneous distribution of the eleventh and twelfth thoracic nerves, with tenderness and guarding in the left renal region and to a lesser extent in the left iliac fossa. Pulse and temperature were normal and the urine showed no chemical or microscopical abnormality. During the next four days the deep pain and guarding disappeared rapidly and the hyperaesthesia became less marked. One month from the onset she still experienced slight aching in the left renal region after a hard day's work, but this had disappeared entirely after a further month.

Case 6.—A man aged 69 gave a history of three days' general malaise and severe pain in the right upper chest. The pain was getting worse and preventing sleep. It was described as a continuous deep ache. Examination revealed neither tenderness to pressure nor hyperaesthesia in the painful area. He had a right-sided Horner's syndrome and scattered varicelliform lesions on the chest, back, and face, but was not aware of the presence of either. Heart and lungs were normal and movement of the

cervical spine was full, free, and painless. Three days later he had vesicular and pustular lesions indistinguishable from those of varicella scattered over the chest, abdomen, and back, with a few lesions on the legs, arms, face, and scalp, and a single vesicle on the soft palate. By the tenth day his pain was much less severe and the lesions were all dry and inactive; the Horner's syndrome was unchanged. By the twenty-eighth day he was free from pain and felt well. Skiagram, differential white-cell count, and E.S.R. showed no abnormality. One year later the Horner's syndrome was unchanged.

In Cases 3, 4, and 5 the rapid onset with segmental pain of both sclerotomal and dermatomal type and general malaise was typical of the pre-eruptive phase of zoster and led one to predict the imminent appearance of cutaneous lesions. No cutaneous lesions appeared, but otherwise the illness ran a course typical of that of zoster, all patients being symptom-free within a few weeks. Case 6 presented with pain of the sclerotomal type only, there being no superficial pain or sensory change. The associated findings of an ipsilateral Horner's syndrome and a mild generalized varicelliform eruption are strong evidence in favour of a diagnosis of zoster.

Painful Muscle Paresis of Obscure Origin

Weber (1916), in his classical paper on muscle paresis due to zoster, suggested that certain examples of painful muscle paresis of obscure aetiology might be regarded as zoster sine herpete. The following are examples.

Case 7.—A woman aged 50 suddenly developed severe aching, felt deeply in the left thigh and buttock and aggravated by active or passive movement of the hip-joint. There was no history of trauma and no complaint apart from the pain. Tenderness was felt to pressure over the greater trochanter and to compression of the thigh. A small area of hyperaesthesia was present over the front of the thigh near its mid-point. Three weeks from the onset the pain in the thigh was still severe, but movement of the hip-joint was less painful. Weakness of flexion and of external rotation of the hip was now noted, with 1½ in. (3.8 cm.) wasting of the left thigh muscles. X-ray studies of the femur, pelvis, hip, and knee revealed no abnormality, and E.S.R. and alkaline phosphatase estimations were normal. After two months there was little change in the physical signs, but the pain was less severe; gradual improvement then took place. Six months from the onset wasting of the thigh could no longer be demonstrated, and power of flexion and of external rotation at the hip were normal.

That this syndrome may have been due to zoster is suggested by the segmental nature of the pain and paresis with absence of general symptoms, and the negative investigations. The pain and tenderness of the hip-joint in the early stages may have been due to zoster arthritis.

Case 8.—A medical practitioner aged 68 complained of rapid onset of severe aching which involved the left side of the lower chest and abdomen, aggravated by movement and by deep inspiration. Twenty-four hours later he noted hyperaesthesia of the overlying skin which increased rapidly in severity. By the next day the pain and hyperaesthesia were intense and he had general malaise, nausea, and hiccup. He lay in bed on his right side with his pyjamas and bedclothes carefully positioned to avoid contact with his left flank. His pulse and temperature were normal. Examination revealed an area of intense cutaneous hyperaesthesia extending in a band round the left lower chest wall and abdomen as far as the midline, in an area corresponding to the cutaneous distribution of the tenth, eleventh, and twelfth thoracic nerves. X-ray studies of the spine showed disk degeneration and osteoarthritic changes in the lower lumbar region but no abnormality of the thoracic spine. On the seventh day he noted a bulging of the lower part of the left abdominal wall with an impulse on coughing, and evident only when in the upright position. Examination showed this to be a pseudo-tumour due to paresis of abdominal muscles. The pain and hyperaesthesia remained very severe for the first 12 days, then abated slowly. Two months later he still had slight hyperaesthesia and occasional sharp stabs of pain; the pseudo-tumour was still evident but less marked. Four months from the onset he was free from symptoms and signs.

In this patient the distribution of the pain and hyperaesthesia was typical of zoster and led one to expect the appearance of a herpetic eruption; but none appeared, and no aberrant vesicles were found despite a careful search. Subsequently there was paresis of muscles supplied by the

same nerves. The hiccup complained of in the early stages was probably due to irritation of nerve twigs supplying the diaphragm.

Visceral Involvement

There is evidence in the literature that visceral involvement due to zoster may occur occasionally in the absence of cutaneous lesions. Duperrat (1945) described a case in which intestinal ileus occurred in association with cutaneous lesions in the distribution of the upper three lumbar nerves, whereas all other cases of ileus due to zoster have been associated with cutaneous lesions in the distribution of the lowest seven thoracic nerves. He expressed the opinion that this patient had involvement of the lower thoracic segments without cutaneous lesions. Curtin (1902) described a case of zoster in which cutaneous lesions on the face were associated with haematuria. Two years later this patient developed cutaneous zoster involving the lumbar region and associated with haematuria. He had no haematuria between these attacks nor for several years following the second attack. It is probable that the haematuria experienced during the first attack was due to a second focus of infection involving the lumbar segments but without cutaneous lesions in those segments. Darget (1929) described a case with symptoms of cystitis in which cystoscopy revealed an inflamed plaque bearing vesicles on the wall of the bladder. This patient had no cutaneous lesions.

In zoster involving the head and neck, it is common for several nerves or nuclei to be involved simultaneously, and, not infrequently, various functions of one of these nerves may be affected without the occurrence of an eruption in its cutaneous distribution. Thus, in one of the cases studied there were no cutaneous lesions of the auricle, auditory canal, or tympanic membrane in spite of involvement of the seventh, ninth, and tenth cranial nerves, all of which are believed to have cutaneous representation in these areas. In another case studied there was pain in the distribution of the maxillary and mandibular divisions of the fifth cranial nerve and in the ear, with facial palsy, diplopia, and loss of taste on the anterior two-thirds of the tongue, yet there were no cutaneous lesions on the face, auricle, auditory canal, or tympanic membrane.

Ophthalmic Zoster

It is surprising how often there is evidence of partial involvement of other nerves in what appears to be a straightforward example of zoster involving a single cranial nerve. In the following example of ophthalmic zoster the presence of pain in the ear led to the finding of loss of taste sensation on the anterior two-thirds of the tongue, providing evidence of partial involvement of the seventh cranial nerve.

Case 9.—A woman aged 57 had suffered from an attack of thoracic zoster many years previously. She developed typical moderately severe left-sided ophthalmic zoster. Oedema and vesiculation were pronounced but the eye was not affected. Early in the attack she had felt some stabbing pains deep in the left ear, with pain spreading down to the neck. Examination revealed a large, tender gland in the neck and loss of taste sensation on the anterior two-thirds of the tongue on the left side. There was no facial weakness, abnormality of hearing or balance, or any eruption on auricle, auditory canal, or fauces. By the seventeenth day she was free from pain, all lesions were dry and inactive, and taste sensation had returned to normal. The only moieties of the seventh cranial nerve involved in this patient were those of taste and of sensation in the middle ear.

A few examples of ophthalmic zoster sine herpette have been described in the literature, the syndrome consisting of involvement of the eye or extrinsic eye muscles, or both, and often associated with pain in the cutaneous distribution of the ophthalmic division of the fifth cranial nerve, but without cutaneous lesions. Parkinson (1948) described a case of ophthalmic zoster followed by ptosis on the same side; he states that it is tempting to assume that certain of the cases of oculomotor paresis of obscure origin, especially

when associated with ophthalmic neuralgia, might be due to zoster sine herpette. He quotes Mules (1903) as having previously made this suggestion. Ahlström (1904) described a case in which corneal zoster was the only form of involvement of the fifth cranial nerve in the course of typical cutaneous zoster of the lumbar plexus. von Hoffman (1880) described a similar case but without any cutaneous eruption.

Lederer (1900) described his findings in a boy aged 8 who gave a six-weeks history of headache and pain in the left eye. The eyelids were inflamed and there was marked photophobia and lacrimation, with considerable conjunctival and ciliary injection. The cornea was dull, particularly in its upper and outer quadrant, where there were numerous small vesicles containing clear fluid. The corneal reflex was absent, and enophthalmos and reduced tension were present. After seven weeks' treatment with atropine, heat, and galvanism vision was 6/6 and tension normal, but there was still slight enophthalmos, decreased corneal sensitivity, and two small opacities in the upper and outer quadrant of the cornea. Lederer regarded these eye changes as so typical of zoster that he thought the patient must have zoster without cutaneous lesions.

Ross (1949) described two examples of ophthalmic zoster without cutaneous eruption. After an initial short period of general malaise, both patients developed severe neuralgic pain over, in, and around the affected eye, with radiation into the occiput, malar region, and side of the nose. Both patients had pre-auricular adenitis, corneal anaesthesia, a disciform keratitis with ulceration and followed by superficial vascularization, oedema of the iris, and motor lesions of the third cranial nerve. The motor lesion was total and persistent in one, partial and of short duration in the other. In both cases the condition ran a pernicious course, with little response to therapy. One finally developed acute glaucoma and required enucleation; the cornea finally recovered in the second case, leaving a dense leucoma.

Ophthalmic zoster sine herpette is not always severe nor the prognosis bad; the following patient made an excellent recovery.

Case 10.—A woman aged 62 gave a three-days history of general malaise and of soreness, "like an inflammation," of the right side of the forehead and scalp, with frequent sharp stabs of pain felt in these areas and in the right eye. There was slight hyperaesthesia of the painful skin area, which corresponded to the cutaneous distribution of the ophthalmic division of the right trigeminal nerve. There was anaesthesia of the right cornea, and near the centre of the cornea was a single, round, circumscribed area of superficial infiltration about 2 mm. in diameter. Intraocular tension was normal and x-ray examination of the sinuses revealed no abnormality. Treatment consisted of analgesics by mouth and topical applications of hydrocortisone and chloramphenicol three-hourly for two weeks. Her symptoms remained unchanged for the first week but improved gradually during the second week. Six weeks from the onset the cornea was no longer anaesthetic and the corneal opacity had absorbed completely. Intraocular tension was still normal. She was free from pain but still felt slight numbness of the right side of the forehead.

Geniculate Zoster

Facial palsy so often complicates geniculate zoster that several writers have suggested that some cases of Bell's palsy without herpetic vesicles on the auricle, especially if associated with auricular pain, may be due to zoster sine herpette. Key-Aberg (1928) claims that this suggestion was first made by Antoni in 1919. It has since been suggested by Aitken and Brain (1933), Spillane (1941), and Engström and Wohlfart (1949). Using their complement-fixation technique, Aitken and Brain obtained positive reactions in all of a series of nine cases of geniculate zoster and in four out of 22 cases of Bell's palsy without eruption. Of these four cases, two had associated auricular pain, and one of these also had impairment of taste sensation. In the following two cases, believed to be due to geniculate zoster without a rash, there were typical painful symptoms without facial palsy, but with other evidence of involvement of the seventh cranial nerve.

Case 11.—A man aged 69, who had had ophthalmic zoster 30 years previously, suddenly developed severe stabbing pain, felt deeply in the left ear, with soreness and hyperaesthesia of the auricle. The pain radiated upwards to the temporal region, backwards over the mastoid process, and downwards into the neck. It was so severe that he was unable to rest by day or by night in spite of consuming large quantities of the common analgesics. Within 24 hours of the onset of pain he noticed that he could hear his clock ticking loudly as though it were "inside the left ear" and that he could not tolerate the wireless at its usual volume. The pain remained severe for 10 days, then became less severe and intermittent. By the 20th day the pain was insignificant but the hyperacusis was still very troublesome. Throughout this period the drumhead, auditory canal, auricle, fauces, and face remained free from eruption and he did not develop facial weakness, impairment of taste sensation, or evidence of labyrinthine involvement. Four months later his hyperacusis was unchanged, but after 12 months his hearing was normal apart from slight discomfort when subjected to excessive noise.

Case 12.—A man aged 72 complained of sudden onset of pain in the left ear, spreading downwards into the throat and upwards over the left half of the forehead and scalp. The pain was described as an incessant ache with a burning and prickling element, and it interfered with sleep by night and day. Examination revealed an intense hyperaesthesia in the whole of the cutaneous distribution of the left fifth cranial nerve and loss of taste sensation on the left side of the tongue in its anterior two-thirds. The pain continued to be severe for 10 days, then abated rapidly; taste sensation returned to normal in two weeks. Soreness and hyperaesthesia of the forehead and scalp were still present, and abated very gradually over a period of six weeks. At no time were there any lesions on the drumhead, auricle, auditory canal, fauces, or face, and there was no sign of facial weakness or labyrinthine involvement. Hearing was normal throughout, the temporal arteries felt normal for a man of his age, and x-ray studies of the skull and sinuses revealed no abnormality.

This patient would appear to have suffered an attack of zoster sine herpette involving both the geniculate and the Gasserian systems.

Acute Labyrinthine Involvement

Hunt (1910), noting the frequency with which symptoms and signs of cochlear or vestibular involvement may appear in association with zoster involving neighbouring ganglia, postulated that the cochlear or vestibular nuclei might be primarily affected in zoster, and that certain cases described as Ménière's disease or toxic labyrinthitis might be due to zoster sine herpette. The following case may be an example.

Case 13.—A man aged 56 complained of general malaise with severe stabbing pains in the right ear for three days. He was apyrexial, and no abnormality was discovered on examination of the drumhead, auditory canal, mouth, teeth, or fauces. There was no mastoid tenderness, taste sensation was normal, and hearing was good on both sides. The next day he suddenly developed severe vertigo with vomiting. He lay motionless in bed, the slightest movement of his head in any plane being sufficient to produce copious vomiting. There was coarse nystagmus; the otalgia was no longer present and did not recur. He remained in this state for four days, then improved rapidly. Examination at this stage revealed no facial weakness or impairment of hearing, and taste sensation was normal. There was no abnormality of sensation or co-ordination. He was able to return to work three weeks from the onset.

In this example of acute labyrinthine involvement a possible zoster aetiology is suggested by the rapid recovery and evidence of simultaneous involvement of the seventh cranial nerve. The latter is suggested by the onset with acute otalgia without physical signs in the ear or fauces, the otalgia preceding all other symptoms by three days.

Unilateral Paresis

Font (1952), in discussing the "jugular foramen syndrome" of unilateral paresis due to lesions involving the last four cranial nerves, expressed the opinion that some of these cases, in which there is no discernible cause, might be due to infection with the zoster virus. In the patient described by Negus and Crabtree (1943) and in the five patients described by Engström and Wohlfart (1949), laryn-

geal and pharyngeal paralyses were associated with herpetic lesions of the auditory canal, pharynx, and larynx, providing sure evidence of their aetiology. The latter authors point out that careful search should be made for vesicles in all unexplained paralyses involving the vagus nerve. In the case described by Alajouanine and Nick (1950), unilateral paralysis of the soft palate, pharynx, and larynx was associated with "herpes zoster cruralis," indicating that there was a second focus of viral infection resulting in motor disturbance of the vagus nerve without herpetic lesions. In one of the cases described by Font (1952) the nasopharynx was reported to have been acutely inflamed at the onset, but when the patient was seen by him on the sixth day there was no inflammation and no herpetic vesicles could be found. This patient had left-sided paralysis of the soft palate, pharyngeal muscles, and vocal cord, weakness of the left trapezius and sternomastoid muscles, loss of taste sensation on the left half of the tongue, and diminution of sensation on the left side of the soft palate, pharynx, and larynx.

Summary

According to the evidence presented, zoster sine herpette should be considered as a possible diagnosis in a variety of syndromes of obscure origin: (1) unilateral segmental pain of sclerotomal or dermatomal type, or both, with complete recovery in a few weeks; (2) certain painful unilateral muscular paresis of obscure origin; (3) unilateral segmental pain associated with certain visceral disturbances of short duration and complete resolution; (4) unilateral ophthalmic neuralgia with involvement of the eyeball, or with paresis of ocular muscles, or both; (5) unilateral otalgia without evidence of middle-ear disease and associated with facial palsy, hyperacusis, or loss of taste sensation on the anterior two-thirds of the tongue; (6) cases presenting as an acute labyrinthitis, or Ménière's syndrome, with evidence of involvement of adjacent nerves, particularly the seventh cranial nerve; and (7) unilateral paralysis of the soft palate, pharyngeal muscles, or vocal cord of obscure origin, especially when associated with otalgia or with an inflammatory reaction in, or around, the entrance to the larynx.

Zoster sine herpette is of more frequent occurrence than has been supposed.

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