

Strawberry Hemangiomas

The Natural History of the Untreated Lesion

ALVIN H. JACOBS, M.D., San Francisco

THE DIVERSITY of opinion concerning the proper management of the common strawberry (cavernous) hemangioma arises from the continued lack of appreciation of the natural history of this lesion. It is the purpose of this communication to call attention to the high incidence of this kind of nevus in infancy and to reaffirm the superior cosmetic results which nature regularly affords when these lesions are not treated.

The lesions to be considered are not the flat vascular nevi (spider nevus, erythema nuchae or port-wine stain), nor the multiple hemangiomatous syndromes, but rather the raised vascular nevi (strawberry marks, cavernous hemangiomas).

Hemangiomas are not truly neoplastic despite their semblance of progressive and invasive growth, but are, rather, malformations originating from a mass of vasoformative tissue misplaced or unused during fetal development.⁶ Enlargement and extension of them are due to canalization and establishment of blood flow in fresh parts of an already existing malformation. The extent of the lesion is, therefore, probably largely predetermined by the distribution and amount of the unused or misplaced vasoformative tissue.

Strawberry nevi may be found on any part of the body surface, appearing first at or soon after birth as sharply delineated pale areas which become bright red, raised and tense within the first few weeks. A firm subcutaneous (cavernous) mass often develops under the surface strawberry lesion and can be felt extending out beyond the area visibly involved. Growth is usually rapid during the first three to six months of life. Then it slows and early signs of involution appear between six months and one year of age. This spontaneous regression is first marked by the lesion's becoming less tense and less bright in color. Frequently at this time small spots of blue discoloration appear, which enlarge and coalesce during the second year. Soon these fade, leaving islands of normal appearing skin. By

• A review of the literature on the natural history of strawberry hemangiomas revealed overwhelming evidence of the satisfactory spontaneous involution of over 95 per cent of these lesions without the scarring and danger of other sequelae inherent in the various forms of treatment.

In a study of 105 strawberry nevi observed for more than one year, 97 per cent of the lesions had either completely disappeared or were regressing satisfactorily.

A cross-section study of 1,735 consecutively examined children in routine pediatric practice showed hemangiomas to be present in 10.1 per cent of all infants from birth to one year of age but that this incidence drops to 1.5 per cent in children over five years of age, confirming the fact of spontaneous involution.

the time the child is four or five years of age, most of the dull remnants of angioma have disappeared, leaving only more or less atrophic skin which gradually reverts to normal texture. In most instances after several years even the child's mother can no longer recall exactly where the lesion was.

The literature of the past 20 years contains many excellent documentations of the natural regression of angiomas. In fact, as far back as 1900, Duncan⁵ in a monograph on vascular lesions, recognized the almost universal tendency of these lesions to spontaneously involute. Stelwagon¹⁰ in 1902 wrote of natural regression of angiomas in his textbook of dermatology. The first actual statistical study of this phenomenon was that of Lister⁸ in 1938. He reported on 77 patients with 93 strawberry hemangiomas. Of these, 92 either regressed completely or were showing definite signs of spontaneous regression. Lister concluded, "No exception has been found to the rule that nevi which grow rapidly during the early months of life subsequently retrogress and disappear of their own accord, on the average about the fifth year of life."

By 1942, the phenomenon of natural regression was recognized by some dermatologists, as evidenced by the statement of Sulzberger and Wolf:¹¹ "Fortunately, most hemangiomas of the cavernous type 'heal' spontaneously with or without ulceration. . . .

From the Department of Pediatrics, Stanford University School of Medicine, San Francisco 15.

Presented before a Joint Meeting of the Sections on Dermatology and Syphilology and Pediatrics at the 85th Annual Session of the California Medical Association, Los Angeles, April 29 to May 2, 1956.

The presentation of this study was made possible in part by a grant-in-aid from the Mead, Johnson Co., Evansville, Indiana.

The regressive changes often appear first in the center. . . . All traces of color have usually disappeared by the fifth year. . . . Since this is the usual course without treatment, drastic measures . . . are often inadvisable, and treatment should generally be expectant and conservative."

Bowers³ in 1951 also stated that the great majority of raised (cavernous) nevi resolve spontaneously—"a happy outcome which differs from that of many forms of treatment in that it is unaccompanied by anything more than the faintest scarring. The ordinary cavernous lesions are never seen in adults."

Brain and Calnan⁴ in 1952 reviewed 614 cavernous angiomas, of which 295 were treated with radium, 98 with x-ray, 74 with radium and x-ray, and 147 were not treated; and as to this last group, they stated, "The ultimate results were equally satisfactory."

Ronchese⁹ in 1953 published an excellent report illustrated by many photographs of spontaneously involuting hemangiomas. He was able to get follow-up information on 33 of the 59 cases in which he had left the lesion untreated. In 24 of these cases the lesion had disappeared completely, in four had not changed and in five had been treated surgically or by radiation elsewhere.

With the aid of school health officers in the Province of Gelderland, Netherlands, Van Der Werf¹² was able to examine 60 school children with remnants of spontaneously involuted strawberry marks and 266 children who had received various forms of treatment. The results were classified as cosmetically satisfactory, moderately satisfactory or unsightly. The results of this survey clearly showed the superior cosmetic results in the untreated cases (Table 1).

In a controlled study, Walter¹⁴ reported 88 cavernous hemangiomas treated by x-ray and 83 untreated. At the end of five years, 96 per cent of the untreated patients and 94 per cent of the treated ones had satisfactory results. Walter concluded that x-ray speeds resolution at first but does not alter the eventual result, and that nature leaves better cosmetic results than x-ray therapy.

Still another well studied series was reported in 1953 by Wallace,¹³ who followed 208 patients with strawberry nevi, many multiple, and 98 patients with 121 cavernous nevi, of which 78 had some superficial capillary element. The period of follow-up was seven years, none of the patients receiving any treatment in that period. His results (summarized in Table 2) clearly demonstrated the high proportion of satisfactory results from spontaneous regression.

Recently Lampe and La Tourette⁷ reported on 112 cavernous hemangiomas in 84 patients with no treatment. In all but one case there was substantial

TABLE 1.—Results in Cases of Treated and Untreated Strawberry Hemangioma (Van Der Werf¹²)

	Untreated	Cautery	Radiation	Operation
Number of cases.....	60	68	62	136
Satisfactory	46	24	15	30
Moderately satisfactory	12	34	25	56
Unsightly	1	10	22	50

TABLE 2.—Results, as Reported by Wallace,¹³ in Series of Untreated Cases of Nevi

	290 Nevi With No Deep Element	121 Cavernous Nevi
Impossible to detect site of nevus.....	120	15
Only slightly atrophic skin remains.....	157	78
Partial involution—not enough remaining cosmetic disability to require treatment	10	20
No involution	3	8

regression by the time the patient was five years of age. This study was illustrated with a series of excellent color photographs demonstrating spontaneous regression. In another recent publication, Bivings² reported on 22 years' observation covering 236 cases. He emphasized the superior cosmetic results of spontaneous resolution and also presented statistical data showing a drop in frequency of these nevi from 8.7 per cent in the first year of life to 0.55 per cent in patients seen after the second birthday. This is strong supporting evidence that spontaneous regression does take place.

In a recent report from the Department of Radiology at Duke University, Abdulkerim, Boyd and Reeves¹ gave data on 323 cases of hemangioma of the skin, all treated with either roentgen irradiation or radium. The period of follow-up was one to twenty years, and the results were as follows: Satisfactory in 72.5 per cent of cases, fair in 22.9 per cent, and poor in 4.6 per cent. The results obtained with radiation therapy, then, were no better than with no treatment as reported by many other investigators. In addition the Duke group mentioned many late complications of radiation, including 18 cases of serious scarring requiring surgical correction, a case of puckering of the lip, one case of shortening of the leg with atrophy of the leg muscles, one case of enlargement of a treated breast and four cases of unsightly telangiectasis.

REPORT OF PRESENT STUDY

The present series consists of 142 patients, seen in private pediatric practice, who had 156 strawberry hemangiomas, including both superficial and deep lesions. Of the 142 patients, 91 were females and 51 males. The 156 lesions were distributed as follows: Head and neck, 50; upper extremities, 21;

trunk, 59; lower extremities, 26. It was possible to get follow-up data on 105 of the lesions for periods of one to five years. In the remaining cases the patients either were treated elsewhere or moved to other communities. In all cases, Kodachrome transparencies were made of the lesions at from three-month to 6-month intervals so that the course of involution could be recorded and objectively observed.*

Of the 105 lesions in which more than a one-year follow-up was possible, 47 had completely disappeared and another 54 had regressed to the point that no cosmetic detracting remained. Only four of the lesions failed to show signs of involution in over one year, and these were all very small lesions which were present at birth and did not grow disproportionately during the first months of life. Thus, of 105 untreated hemangiomas observed for one year or more, 97 per cent were either entirely gone or had regressed to the point that eventual resolution was certain.

In order to gain further evidence on this matter of spontaneous involution as well as information as to the prevalence of this type of lesion, a cross-section study was carried out in which the incidence of strawberry nevi or of detectable remnants of nevi at various ages was recorded in a series of 1,735 consecutive children examined in routine private practice. The results are shown in Table 3.

The striking feature of this study was the high incidence of the nevi in infants (10.1 per cent) as well as the clear evidence that the great majority of nevi disappear with no recognizable residual by five years of age.

CONCLUSION

If a strawberry (cavernous) hemangioma appears during the first few weeks of life, and grows during the first few months of life, then treatment should be withheld, since there is a remarkable tendency for this type of lesion to regress spontaneously.

595 Buckingham Way, San Francisco 27 (Jacobs).

*A selection of these color transparencies was shown as an exhibit at the Convention of the California Medical Association in May, 1955 and at the Academy of Pediatrics in October, 1955. A portion of this exhibit has also appeared as a Clinicolor Feature in Modern Medicine, May 1, 1956.

TABLE 3.—Incidence of Strawberry Nevi in 1,735 Consecutive Children Examined in Routine Pediatric Practice

	Number of Children Examined	Incidence of Angiomas (Per Cent)
Birth to 1 year.....	645	10.1
1 to 3 years.....	484	8.1
3 to 5 years.....	274	2.9
5 to 15 years.....	332	1.5

ACKNOWLEDGMENT

The author wishes to express his gratitude to Dr. Eugene M. Farber, Head of the Division of Dermatology, Stanford University School of Medicine, for his encouragement and assistance.

REFERENCES

1. Abdulkerim, A., Boyd, J. A., and Reeves, R. J.: Treatment of hemangioma of the skin in infancy and childhood by roentgen irradiation and radium, *Pediatrics*, 14:523, 1954.
2. Bivings, Lee.: Spontaneous regression of angiomas in children, 22 years observation covering 236 cases, *J. Pediat.*, 45:643, 1954.
3. Bowers, R. E.: Treatment of vascular nevi, *Brit. Med. J.*, 1:121, 1951.
4. Brain, R. T., and Calnan, C. D.: Vascular nevi and their treatment, *Brit. J. Dermat.*, 64:147, 1952.
5. Duncan, J.: *Angioma and Other Papers*, Edinburgh, Oliver and Boyd, 1900.
6. Innes, F. L. F.: Classification of hemangiomas, *Brit. J. Plastic Surg.*, 6:76, 1953.
7. Lampe, I., and La Tourette, H. B.: The management of cavernous hemangioma in infants, *Seminar (Sharp & Dohme)*, 17 (No. 3):2, 1955.
8. Lister, W. A.: Natural history of strawberry nevi, *Lancet*, 1:1429, 1938.
9. Ronchese, F.: Spontaneous involution of cutaneous vascular tumors, *Amer. J. Surg.*, 86:376, 1953.
10. Stelwagon, H. W.: *Treatise on Diseases of the Skin*, Wm. Wood & Co., New York, 1902.
11. Sulzberger, M. B., and Wolf, J.: *Dermatology Therapy in General Practice*, 2nd Ed., Year Book Publishers, Inc., Chicago, 1942.
12. Van Der Werf, E.: Spontaneous disappearance of hemangiomas, *Nederl. Tijdschr. Geneesk.*, 98:676, 1954.
13. Wallace, H. J.: The conservative treatment of hemangiomas, *Brit. J. Plastic Surg.*, 6:78, 1953.
14. Walter, J.: On the treatment of cavernous hemangiomas with special reference to spontaneous regression, *J. Faculty Radiologists*, 5:134, 1953.

