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Spontaneous Bruising on the Face, Neck and Chest

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Abstract

Background: Bruises are due to the blood leaking from vessels into the dermis. They usually occur at sites exposed to trauma, mainly the lower limbs, outer hips and arms. Spontaneous bruising (purpura and ecchymoses) restricted to the face, neck and chest are an exception to the rule.

Objective: In patients hospitalized in geriatric/palliative care to observe the clinical context, presentation, management and course of bruising restricted to the face, neck and chest.

Results: Eighty beds are designed in our institution for comprehensive geriatric and palliative care. Seven patients during a 5-year period developed bruises restricted to upper body areas – the eyelids, face, and neck, outlet of the chest or a combination of those. The following features were common to the patients at the time bruises emerged: troubling coughing and straining (except one patient); no change in their general condition, platelet count, prothrombin time and hemoglobin; no bleeding at other sites; no impact on the patients' condition.

Discussion: Bruising limited to the head, neck and upper torso differs from the usual distribution of bruises in hematologic disease and trauma. It is the consequence of high intrathoracic pressure under straining and coughing, reversing the venous flow to the upper body parts, causing high pressure stasis and rupture of capillaries. The latter explanation is supported by Bradford Hill Criteria of causality, the absence of a bleeding diathesis, and bruising with this particular distribution being an innocent event.

Conclusion: Purpura and ecchymoses confined to the thoracic outlet, neck and/or face, occurring in the absence of an underlying coagulopathy, vasculitis or systemic bleeding, was a benign occurrence. It should not be confounded with an echymosis expanding to the skin from an internal organ, that needs urgent intervention.

Keywords: Pressure Ulcer; Decubitus Sore; Pressure Injury; Palliative Care

Introduction

Bruises are due to leaking of blood from small vessels into the dermis. Bruises are classified by their size: petechiae, purpura and ecchymoses. Petechiae are pinhead in size, distributed in crops, mostly in areas of increased venous pressure, i.e. the lower extremities. Purpura refers to bruises larger than petechiae with variable shapes. Ecchymoses are bruises larger than 10 mm. Bruises may be due to blunt trauma of sufficient power to damage normal blood vessels in the skin or may be due to minor trauma when the vessels are fragile. When bruises occur spontaneously, abnormalities of the blood vessels, the surrounding skin, platelets or coagulation may be the cause [1,2].

The distribution of bruises can hint to the triggering event. Bruises linked to normal physical activities tend to appear on distal upper and lower extremities. Bruises from bleeding disorders usually occur at sites that are exposed to trauma, i.e. the lower limbs, outer hips and arms. In patients being assisted with transfers and ambulation bruises occur over the upper extremities, bruising from restrains occur on the chest, bruises from physical abuse locate on the trunk, back or face [1-3]. Increased venous pressure may determine the site where bruises occur. Under the effect of gravitation on the venous pressure bruises predominate over the ankles and calves. Bruising confined to the head, neck and upper torso involving selectively the upper but not the lower body areas differs from the usual distribution of bruises in hematologic disease and trauma. They have been described as case reports in variety of situations: paroxysmal coughing, vomiting, Valsalva maneuver, epileptic seizure, myocardial infarction, proctoscopy, chest trauma, bungee jumping, yoga, and power lifting [4-14] and ascribed to bursts of high intrathoracic pressure. The incidence of their occurrence in general and, particularly, in patients with multimorbidity is unknown, nor is recognized the significance of antigravitational bruising on the subjects' general health. We could not find in the literature an explanation to the singular, antigravitational distribution of bruising.

The present case series, comprising consecutive patients with spontaneous bruising limited to the face, neck and chest, provided the opportunity to relate bruising to the subjects' underlying diseases, the clinical context when bruising occurred, the time course of bruising versus the time course of the patients' general health. This might be the basis for answering five essential questions in practice, for the doctor's knowledge and the patient's information: what is the diagnosis, the cause of bruising, the therapy, prognosis, how to prevent recurrence? Should policies be changed in the hospital relative to this problem? Answers may come up in following the disease course under long-term hospitalization.

Methods

Two wards in our institution covering 80 beds are designed to patients in need of comprehensive geriatric and palliative care. In the period January 1st 2015 – December 31st 2019 in the two wards resided 1442 patients. Seven among them developed bruises limited to upper body areas – the eyelids, face, neck, arms, the outlet of the chest, or a combination of the latter. The seven patients were included in the study. There were no exclusions. The patients were cared for by the author of the study. Their main diagnoses, clinical features, blood count, liver and renal function tests, prothrombin time, were periodically assessed. When bruising became apparent, physical examination focused on possible extracutaneous bleeding (hematoma, melena, hematuria), new neurologic deficit, altered vision. Laboratory tests focused on changes of the hematocrit, BUN:creatinine ratio, platelet count and prothrombin time. For any suspicion of extracutaneous bleeding the patient was referred for diagnostic work-up to a tertiary care hospital. Photographs of the patients were taken with the patients' consent or their legal guardians'. The patients were managed according to common standards of care. No extra testing, imaging, experimental procedures or treatments were applied. The patients were prospectively followed by the author to the present time or until their demise.

Results

This case series comprises six 6 males and one woman; their age ranged 63 to 88 years (median 82 years). The patients' chief diagnoses were malignancy in three, end stage heart failure, tetraplegia, traumatic brain injury and pressure sores in one patient, respectively. All patients were breathing spontaneously, three of them through tracheostomy; the latter needed frequent suctioning of tracheal secretions. All except one had spells of heavy coughing and straining. Straining was witnessed in relation to defecation or whilst opposing to transfers and positioning. Bruising consisted of purpura in four patients and a combination of purpura and ecchymoses in three. Bruising was limited to areas of the face, neck and chest, not involving the abdomen, back and the lower extremities. Bruising was permanent in Patient 1 (who died 3 weeks after admission) and sporadic in the others. Bruises were bilateral in all but began unilaterally in four patients. Two or more events of bruising occurred in five patients, always in the upper body parts, usually involving new areas different from those affected before. At the time the bruises occurred there was no evidence of bleeding in organs or systems, no alteration of the patient's general condition, no substantial change in their blood pressure, hematocrit, platelet count and BUN:serum creatinine ratio. The bruises resolved spontaneously and did not recur in Patients 2, 3 and 7. In Patients 4 and 5 bruising on the face and neck recurred but affected new areas. Patient 6 died one month after the bruises had resolved. In the presence of dermatoporosis (two patients) there was no anatomic overlap between bruising on the head, neck and chest and the areas of involved by dermatoporosis. Minor trauma to the head was witnessed in Patients 3 and 4, recognized as a rub in anatomic proximity with some bruises; however, rub and bruise were not overlapping.

The patients' main clinical features, the context of bruising and the sites involved by bruises are shown in Table 1. Three illustrative case histories are presented briefly.

Patient	Gender	Age years	Bruises uni- or bilateral	Concomitant bleeding	Chief diagnosis	Cough, straining	Minor trauma	DP	Anticoag.
1	F	63	Head, neck, chest, arms - bilateral	N	End stage heart failure, severe tricuspid regulation	Y	N	Y	Warfarin
2	M	79	Upper eyelid, - bilateral	N	Tetraplegia, tracheostomy	Y	N	N	N
3	M	88	Face and neck unilateral, lateral chest bilateral	N	Multiple myeloma, palliative care	Y	Y	N	N
4	M	84	Head and neck, - unilateral	N	Traumatic brain injury, tracheostomy	Y	Y	Y	N
5	M	68	Midline chest, unilateral neck	N	Cholangiocarcinoma, chemotherapy	N	N	N	N
6	M	82	Chest and neck bilateral, later face	N	Pressure core, endstage dementia	Y	N	N	N
7	M	83	Forearms, arms, neck, chest	N	Metastatic prostatic carcinoma, DVT, severe aortic stenosis	Y	N	Y	Y

Y: Yes; **N**: None; **DP**: Dermatoporosis; **Anticoag**: Anticoagulant Treatment

Table 1: Patient features, context of bruising limited to the upper body areas

Patient 1: A 63-yr-old woman was referred for palliative care with end-stage heart failure, ischemic heart disease, prosthetic mitral valve, severe pulmonary hypertension, and severe tricuspid regurgitation. She was chair-ridden, dyspneic though receiving oxygen by nasal prongs. The jugular veins were engorged. There was ++ calf edema. The skin on her arms and forearms was thin, with numerous wrinkles, pseudoscares, hyperpigmented spots and a few bruises, a complex expressing skin ageing [15]. Bruises were prominent on her face, neck, upper chest, forearms and arms, while the lower body parts were spared (Figure 1A and B). She was treated with daily furosemide 200 mg, spironolacton 25 mg, vitamin B1 and warfarin. Remarkable among her laboratory tests were serum sodium 129 mEq/L, BUN 60 mg/dL and serum creatinine 1.6 mg/dL. The prothrombin INR was 1.8 – 2.5 under anticoagulant treatment. The platelet count was within the normal range. Bruises on her face, neck, and chest occurred in the absence of concomitant bleeding, neither in the skin nor systemic. Three weeks following her admission the patient died in end-stage heart failure. There was no evidence of bleeding other than the bruises seen in the figure.

Figure 1A: Bruises disseminated on the patient's face, neck, upper part of the chest, arms and forearms. There are characteristic features of dermatosclerosis on the forearms

Figure 1B: Calf edema, no bruises

Patient 2: A 79-year-old man with a history of bipolar depression suffered an injury to the cervical spine with subsequent tetraplegia. He was mechanically ventilated, then weaned from the ventilator, but could not be weaned from tracheostomy. He received enteral feeding through a nasogastric tube, having refused gastrostomy. The daily medications were quetapine 150 mg, lamotrigine 100 mg, amitriptilin 50 mg, amlodipine 5 mg and ramipril 2.5 mg. The patient's blood pressure was controlled at a median 122/69 mmHg. In November 2014 a bruise was noticed adjacent to the left upper eyelid. Seven days later another bruise occurred in a similar location on the right side (Figure 2A). The patient was frequently coughing and straining. The platelet count and prothrombin time were within the normal range. Bruising was attributed to bursts of high intrathoracic pressure. In the following no additional bruises occurred and those present faded within a few weeks (Figure 2B). While the patient is still in our treatment in 2019 and there are abundant tracheal secretions needing frequent suctioning, he continues coughing and straining, but there was no recurrence of bruising.

Figure 2A: Bilateral eye lid ecchymoses which occurred successively, first on the left side

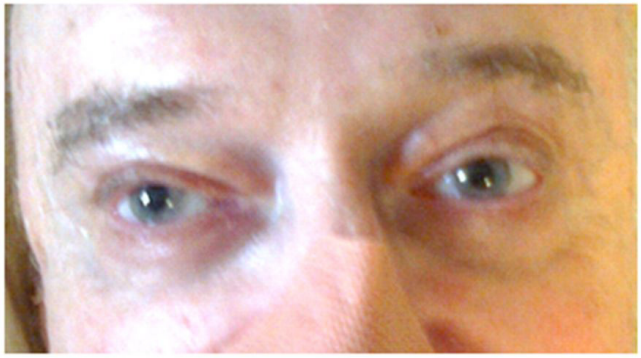

Figure 2B: Three weeks later the ecchymoses resolved

Patient 3: A 88-year-old man was recovering after urosepsis, shock and acute on chronic renal failure. He was admitted for post-acute care with a stage 4 presacral decubitus ulcer. Two years previously he was diagnosed with multiple myeloma which complicated with vertebral compression fractures and renal failure. Chemotherapy for myeloma has been discontinued because an unfavorable risk-benefit profile. The patient was also under psychiatric treatment for major depressive disorder. His stance and gait were unstable. Lately he was confined to chair and bed. On admission, the hemoglobin was 9.1 g/dL, BUN 93 mg/dL, serum creatinine 2.9 mg/dL, albumin 3.1 g/dL, globulin 2.8 g/dL, and lambda free light chain in the serum 970 mg/dL (normal range 5.7 – 26.3). The patient's daily medications were allopurinol 100 mg, mirtazapine 30 mg and quetapine 200 mg. Repeated urinary tract infections were treated with antibiotics. Several bursts of bruising occurred unrelated to febrile events. Initially bruises were noticed on the patient's right eyelid, conjunctiva and the right lateral aspect of the neck (Figure 3A). Ten days later, after resolution of the conjunctival and lid bruises, bruises appeared on the upper torso (Figure 3B). There was frequent straining under the patient's effort to rise from bed while refusing assistance. A possible causal relationship between multiple myeloma and bruising was considered since vessel wall involvement by amyloid may cause bruising [4]. However, all bruises resolved within 3 weeks and did not recur on follow-up until the patient's demise one year later.

Figure 3A: Conjunctival and eye lid ecchymosis

Figure 3B: Bruises on the chest

Discussion

Bruising on the face, neck and chest, occurring in the absence of bleeding in other sites, the skin or systemic, appeared not to be the complication of any particular disease. This is in accord with reports in the literature not finding a link between spontaneous bruising restricted to the face, neck and chest to any particular disease, but to coughing and straining [4-15]. Neither had bruising a noticeable impact on the course of the patients' primary diseases and general health. This study differs from other reports by addressing severely ill patients with multimorbidity, as compared to subjects with acute illness or accidents in most published reports [4-15]. The long-term patient follow-up in the present study, in contrast to short observation in most other reports, permitted insight to the prognosis.

The literature consistently refers to the relationship between high intrathoracic pressure and bruising limited to the face, neck and upper trunk. Clinical and experimenatl studies showed that high intrathoracic pressure is transmitted to the vena cava, resulting in reversal of the venous flow, stasis in the venous tributaries, capillary stasis and bleeding by break of small vessels [5-9,16]. Intrathoracic pressures as high as 300 mmHg may occur during coughing [16]. Comparable high intrathoracic pressures but lasting much longer occur during chest trauma [10], vomiting, spontaneous straining or Valsalva maneuver. Case histories illustrate the point in practice [5-9,16]. Yet, the reason to the fact that high intrathoracic pressures affect selectively capillaries in upper but not the lower body segments could not be found in the literature.

We propose the following explanation based on the equation *Energy = Pressure x Volume*. The superior vena cava and the inferior vena cava are equally exposed to the bursts of high intrathroracic pressure. Because the thoracic segment of the inferior vena cava is merely a small segment of the vein, while the superior vena cava is entirely intrathoracic, the blood volume exposed to intrathoracic pressures in the superior vena cava is several times larger than the blood volume exposed to intrathoracic pressure in the inferior vena cava. Therefore, the energy conveyed by high thoracic pressure to the tributaries of the superior vena cava is many-fold higher than the energy conveyed to the tributaries of the inferior vena cava. So, in theory, bruising caused by high intrathoracic pressure affects with predilection the upper body parts, is antigravitational, as in fact it is seen.

Epidemiologic evidence also supports the causality of the association between coughing/straining and bruising in the upper body segments. The Bradford Hill Criteria are the most frequently cited system for causal inference in epidemiologic studies [17]. The following criteria of causality between coughing/straining and bruising in the upper body segments were met according to the Bardford Hill bundle: Consistency, i.e. the association whitnessed by different persons in different places on different samples [5-14]. Plausibility, i.e. the "cause-and-effect story" makes sense with all knowledge available. Experiment: in testing a patient's capillary fragility, the examiner applies to the subject's forearm a negative pressure of 375 mmHg, which approximates the intrathoracic pressure during cough [18]. Analogy: external compression of the chest under accidental crush causes petechiae on the patient's face and bulbar conjunctiva [10,19] which are similar to bruises provoked by straining and cough. Yet, there are limitations to our understanding the disorder we are witnessing. Unexplained to us is the fact that bruising was not reproducible on repeated exposure and that bruising was confined to some locations but not to other within the area exposed to high venous pressure.

The differential diagnosis in our patients was straghtforward. Bruising in the seven patients presented differd from senile purpura which is usually superimposed on dermatoporosis [18] and also from bruising due to systemic disease, which is localized predominantly in dependent body areas [1]. The distinction from bruising due to physical abuse is important for amending suspicions and is simply done by the experienced clinician. Rough handling may result in bilateral bruises from fingertips on the upper extremities, on the neck from strangulation, or the inner thighs from sexual abuse. Bruises that result from physical elder abuse are larger, usually more than 5 in size [20]. The differential diagnosis with an echymosis expanding from an internal organ to the skin is paramount, but should not be difficult based on associated acute pain and hypotension, the clinical context, as well as the different pattern and large extent of the bruise [21-23].

Based on prospective observation of patients in the present study we propose answeres relevant to clinical practice. What is the diagnosis and its significance? - bleeding from small vessels within the skin. The cause? - coughing and straining. Therapy? – no particular intervention is needed beyond good nursing. In our ward patient management was limited to thorough observation. We felt that further than thorough physical examination and basic laboratory tests investigations would not be useful and that a lenient approach might be appropriate. On the contrary, urgent intervention is indicated when, contingent to bruises, intraocular, intrathoracic or systemic bleeding is suspected [21-23]. The prognosis? - in the given context and clinical presentation antigravitational purpura is an innocent occurrence. This is attested by long time observation of the patients in the present case series. Newertheless caution is needed since a Valsalva manoeuvre, i.e. straining under physician assitence, caused occasionally a preretinal or retinal hemorrhage [24]. How to prevent recurrence and should policies be changed? – good nursing might benefit the patients in many aspects; there is no proof that it might benefit in this particular issue.

Conclusion

Purpura and echymoses limited to the thoracic outlet, neck and/or face represented an innocent occurrence devoid of clinical consequences. It might be attributed to bouts of high intrathoracic pressure during straining and coughing. This benign occurrence should be distinguished from echymosis expanding to the neck or chest wall from an internal organ, the latter needing urgent diagnostic imaging and treatment.

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