



Rectal wall hemorrhage in hanging autopsy cases

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ABSTRACT

The aim of our study was to analyze hemorrhagic lesions of the rectal wall in hanging autopsy cases. All autopsy reports regarding hanging from January 1st, 2008 to December 31st, 2010 were retrospectively reviewed. One hundred and two hanging cases were selected out of 1379 autopsy cases. Rectal wall hemorrhage was found in about 4% of the cases ($n = 4$). Two of these 4 cases (50%) were associated with bowel wall hemorrhage, suggesting a similar possible etiology by abdominal congestion during the agonal phase. Another etiology could be an hemorrhagic lividity in the rectum. As it is not possible to determine with certainty the etiology, even with the use of histology, the detection of rectal wall hemorrhage cannot be used as another sign of vital hanging. Such rectum changes raise the possibility of sexual assault. Forensic pathologists should be aware of such an occurrence and avoid potential harmful misinterpretation.

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1. Introduction

Bowel wall hemorrhage was recently described in an autopsy study population comprising 74 cases of suicidal death by hanging; intramural hemorrhages were found in about 12% of the cases examined [1]. In the study, the sites of hemorrhage were respectively the large and the small bowel, but no case of rectal wall hemorrhage was found [1]. From our autopsy experience, we found hanging death cases showing hemorrhage in the rectum wall. As such findings can mimic bruising suggesting rectal trauma secondary to a sexual assault, we decided to perform a study in order to analyze such rectal lesions and to know if they may be linked to bowel wall hemorrhage.

2. Materials and methods

2.1. Subjects

All autopsy cases between January 1st, 2008 and December 31st 2010 for which the cause of death was hanging were retrospectively reviewed. Bodies showing advanced state of putrefaction were excluded from the study. One hundred and two cases corresponding to the inclusion criteria were selected from the 1379 forensic autopsies performed in the department.

For each case included in this study, the following parameters were recorded: gender, age, height, weight, Body Mass Index

(BMI), post mortem interval (PMI), putrefactive changes, manner of death, manner of hanging (complete vs. incomplete hanging), signs of congestion in the head and neck region, presence or absence of hemorrhage in the rectal wall, presence or absence of bowel wall hemorrhage, preexisting diseases, resuscitation attempt, signs of heart failure and toxicological results when available.

The same autopsy protocol was used for the 102 hanging cases, including complete examination of anal canal, rectum, small and large bowel. All autopsies were carried out by senior pathologists.

2.2. Histological study

For the cases showing hemorrhage in the rectal wall, samples were carried out in order to perform a microscopic study with the standard hematoxylin–eosin stain. Standard histology was completed by an immunohistochemical study using the monoclonal antibody antihuman Glycophorin A (GPA) (Dako), dilution 1:400.

Cytological study with the standard Papanicolaou stain was carried out from rectal swabs performed at the time of autopsy for the cases showing rectal hemorrhage.

2.3. Statistic evaluation

To compare the two groups (with and without rectal wall hemorrhage), the Fisher exact test was used to test differences in proportions and non parametric Wilcoxon signed-rank test was used to test differences in means.

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3. Results

During the period of the study, 102 individuals dying from hanging were autopsied. Two groups were defined from this population: One group showing rectal wall hemorrhage and one group without rectal wall hemorrhage.

3.1. Group showing rectal wall hemorrhage

Four cases (3.92% of the studied population) showed rectal wall hemorrhage. The sex ratio (M/F) was equal to 3. The mean age was 37.5 years (range 25–46 years old). The mean height was 170.5 (range 159–185 cm). The mean weight was 70.5 kg (range 63–78 kg). The mean BMI (kg/m^2) was equal to 23.86 (range 22.8–25.9). The mean PMI was 38.25 h (range 23.5–52.5 h). Putrefaction was absent for all the cases. Manner of death was suicide in three cases. The other case was an accidental auto-erotic asphyxia.

All characteristics of the four cases are shown in Table 1. In all cases, hemorrhages were macroscopically detectable and predominantly found in the mucosa. In case 1, hemorrhage was strictly located in the anal margin mucosa. Fine mucosal erosions were found in the same area. For case 2, hemorrhage extends in the rectal mucosa to a height of 4.5 cm from the anal margin. Hemorrhagic lesions were composed of multiple sharply delimited linear streaks, usually parallel to each other, roughly in a vertical arrangement and sometimes confluent (Fig. 1). The lesions were on a background of diffuse mucosal congestion. The upper limit between mucosa showing hemorrhagic lesions and normal mucosa was sharp. Hemorrhagic lesions were associated with circumferential fine linear or dot-like mucosal erosions in the anal margin. The maximal size of these erosions was 1 cm. Rectum of case 3 showed similar findings to the case 2 with a height of 6 cm from the anal margin where lesions were found, but without any mucosal erosion. Findings for the case 4 were also similar. The hemorrhagic lesions extended to the middle third of the rectum. They were associated with two superficial erosions, the largest measuring 3 mm, lying on the anal margin at the 12:00 o'clock position (Fig. 2). Erosion margins showed no hemorrhage.

In all cases for which rectal hemorrhages were macroscopically detectable, histology showed strong vascular congestion of all layers of the rectal wall and mild autolysis of the mucosa. Various sized hemorrhages were mainly found in the mucosa (Fig. 3) and to a lesser extent in the serosa. They were also focally seen in the submucosa and the muscularis (Fig. 4). Rectal wall hemorrhages



Fig. 1. Macroscopic findings of the case 2: multiple sharply delimited linear streaks, usually parallel to each other, roughly in a vertical arrangement and sometimes confluent (view of the rectum with on the anal margin on the left). Slight mucosal autolysis near the hemorrhagic area.

were confirmed by immunohistochemistry, which also highlighted that some mucosal hemorrhages were well circumscribed in the lamina propria, without any crypt destruction (Fig. 5). Hemorrhage showed no angiocentric distribution. No edema and no inflammatory reaction were found in the areas of hemorrhage, and no vascular thrombosis. Superficial mucosal erosions were confirmed in cases 1, 2 and 4. No fibrin and no inflammatory reaction were seen in the area of the mucosal erosions (Fig. 6). No spermatozoa were found after cytological examination of post mortem rectal samples in all four cases showing rectal wall hemorrhage.

3.2. Group without rectal wall hemorrhage

The sex-ratio (M/F) was equal to 3.9. The mean age was 42.5 years (range 13–102 years old). The mean height was 173 (range 147–196 cm). The mean weight was 71.5 kg (range 41–106 kg). The mean BMI was equal to 23.8 (range 15.4–34.1). 55.8 h (range 20.5–122 h) had elapsed between the time of death and the forensic autopsy. Putrefactive changes in terms of green discoloration of the abdominal wall were found in 28.4% of the

Table 1
Characteristics of the cases showing rectal wall hemorrhage.

	Case 1	Case 2	Case 3	Case 4
Gender	M	F	M	M
Age (years)	41	34	46	25
Height (cm)	162	159	179	185
Weight (kg)	68	63	73	78
Body mass index (kg/m^2)	25.9	24.9	22.8	22.8
Post mortem interval (h)	25.5	52.5	51	23.5
Putrefaction	No	No	No	No
Manner of death	Suicide	Suicide	Accident	Suicide
Manner of hanging	Not complete	Not complete (Squatting)	Not complete (On one's knees)	Not complete
Congestion in the head and neck region	+	+	–	+
Signs of heart failure	–	–	–	–
Resuscitation cares	–	–	–	–
Bowel wall hemorrhage	–	+	–	+
Preexisting disease	LVH*	–	–	–
Blood alcohol	NA**	1.61%	0.48%	NA**
Concentration/post mortem toxicology		Infratherapeutic level of zolpidem Therapeutic level of paroxetine	Therapeutic level of levirapine Amyl nitrite in lungs	

* Left ventricular hypertrophy.

** Not available.

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