QUALITY OF LIFE, QUALITY OF CARE, AND PATIENT SAFETY

TATTOO ADVERSE REACTIONS: DISCOVERING INK COMPOSITION THROUGH A MULTIANALYTICAL APPROACH

Flavia Persechino [1] - Severino Persechino [2] - Chiara Toniolo [3] - Alessandro Ciccola [4] - Ilaria Serafini [5] - Antonella Tammaro [6] - Roberta Curini [4] - Paolo Postorino [7] - Mauro Serafini [8]

Sapienza University Of Rome, Department Of Clinical And Molecular Medicine, Rome, Italy [1] - Dermatology Unit Of S. Andrea Hospital, Sapienza University Of Rome, Nesmos Department, Rome, Italy [2] - Sapienza University Of Rome, Department Of Environmental Biology, Rome, Italy [3] - Sapienza University Of Rome, Department Of Chemistry, Rome, Italy [4] - Sapienza University Of Rome, Department Of Physics, Rome, Italy [5] - Dermatology Unit Of S. Andrea Hospital, Sapienza University Of Rome, 1nesmos Department, Rome, Italy [6] - Sapienza University Of Rome, 4department Of Physics, Rome, Italy [7] - Sapienza University Of Rome, Department Of Environmental Biology,, Rome, Italy [8]

Introduction: from its initial ritual meaning, tattooing practice has gained an aesthetic significance. Consequently, this practice has spread all over the world, but along with this trend adverse reactions risk to inks has grown. While several studies report cases of allergic reactions to tattoo inks, others reveal the dangerous potential of pigments photodegradation products.

Objective: this perspective study was aimed to design new methodologies to clarify the composition of tattoo inks and to individuate components with dangerous potential. Moving from preliminary results of feasibility, a multi-technical approach was applied to complete characterization of commercial formulations.

Materials and Methods: several inks, which had given adverse reactions in patients, were separated through High-Performance Thin-Layer Chromatography. Every formulation resulted in presence of different pigments and not-colored components, identified through Raman Spectroscopy.

Results: the combination of separative (HPTLC) and spectroscopic (Raman) techniques allowed the identification of the different chemical components. Raman spectra were collected on the separated spots on HPTLC plates, with consequent complete characterization of commercial formulations. Potentially dangerous components were isolated and identified, clarifying the causes of adverse reactions in patients. Furthermore,

once obtained a Raman database of each components, we are able to analyze every commercial formulation, individuating easily its composition and its potential damage.

Conclusions: the Raman analysis and its integration with chromatography resulted successful in discovering the various chemical species present in the dangerous inks. The simplicity of this methodology makes it suitable for routine analysis and quality control of tattoo formulations. In this perspective, chemical characterization of tattoo inks provides great advantages not only in terms of decrease of health risks, but also in reduction of medical care spending. Finally, this approach constitutes the preliminary step for new diagnostic methodologies applicable directly on patients for non-invasive identification of toxic compounds.